

THE MARINE REVIEW

VOL. 37.

CLEVELAND, FEBRUARY 20, 1908.

NEW YORK

No. 8

GEORGE W. DICKIE ON THE NAVY.

George W. Dickie, for many years manager of the Union Iron Works, San Francisco, Cal., made a striking speech at the annual banquet of the California Metal Trades Association in San Francisco lately. He took serious exception to the article which Henry Reuterdaahl recently published in *McClure's Magazine* on the vulnerable nature of American battleships. Mr. Dickie did not think that Reuterdaahl knew very much about it. He represented that Reuterdaahl was simply threshing out questions that had been mooted in the navy for years. Dickie personally believed the armor belts to be properly placed, having considerable submergence when the ship is fully loaded, so that in rolling it still protects the most vulnerable part of the hull. There was one statement, however, in Reuterdaahl's article which met with Dickie's approval. This statement was:

"The United States navy is built, equipped and operated by bureaus. The criticisms of the navy all come back to them. They are, where the criticisms are to be acted upon, practically both the judge and defendant. Naturally they acquit the defendant and almost invariably this kills the criticism."

Upon this subject Mr. Dickie spoke with considerable emphasis, saying:

"There is a good deal of truth in this statement of the attitude of the bureau in regard to any suggestion for improvement in naval design from those on the outside. This is unfortunate, for I believe that if the bureaus could take the best naval architect and shipbuilding talent of the country into their council in regard to designs for new warships we would be abreast of instead of lagging behind Great Britain. Last

year those of the public interested in such things thought that a real movement in the right direction was at last being made that would result in uniting the outside talent with that of the bureaus in the design for new battle ships now being built. I do not think that in this company it would be amiss to narrate my own experience in this connection.

"In the act making appropriations for the naval service approved June 29, 1906, a provision was made that before approving any plans or specifications for the consideration of a battleship, the secretary of the navy would afford a reasonable opportunity to any competent constructor who may desire so to do to submit plans and specifications for his consideration, for which plans such compensation should be paid as the secretary should deem equitable.

"Under date of July 19, Acting Secretary Newberry invited me to submit plans if I so desired. This invitation aroused in me the old desire to do something for the navy and I started the making of plans to embody all my study of battle ship requirements. These plans cost me a great deal of thought and time and money for draftsmen's wages, etc., and on October 24, 1906, I submitted my plans to the secretary of the navy.

"My plans were so worked out and described that I felt sure of some recognition at the navy department. But when the special board appointed by the secretary to examine and report on the designs submitted was found to be composed practically of the board of construction, that is the bureau chiefs with the assistant secretary as president, I lost my interest in the result.

"On Dec. 18, 1906, I received from the navy department a letter stating that:

This special board on design submitted its report under date of Nov. 19, 1906, and the department under date of Dec. 12, 1906, transmitted to congress the report of the board and the plans and specifications of the design which had been selected as the one best fulfilling the requirements of the act. While the report of the board clearly indicates that the design submitted by you was not regarded as embodying all the essential characteristics of a battleship in so high a degree as did the design of the board on construction of the navy department, the department begs to thank you for your interest in this matter and to express its appreciation of the labor bestowed by you upon the design submitted.

"Now this special board did the natural thing in selecting its own plan as the best. I would have selected my plan as the best if I had the chance they had. But the fact that this board was to decide whether its own plan or some other plan was the best made it impossible for the navy department to benefit in the slightest by the labor bestowed on the outside plans.

"One naval architect in the East who had sent in plans showed me the letter he received from the department and it was word for word the same as mine. A well-known English naval architect who had sent in elaborate plans sent me a copy of the letter he had received from our navy department, and it was word for word the same as mine. It seemed to me that these letters were prepared before the plans were examined, if they ever were examined.

"On Jan. 7, 1907, I replied to the letter of the department, stating that I had seen similar letters sent to others who had submitted designs and expressed my surprise at the board being able to express in the same words its disapproval of plans so entirely different from one another and asked for a copy of the findings of the board and its discussion of the various plans submitted, but have been informed that that matter is held private by the department."

THE BUSY PORT OF KARACHI.

BY WALTER J. BALLARD.

According to Consul E. H. Dennison of Bombay, in *Daily Consular and Trade Reports*, Karachi, India, is a very busy port. It serves the province of Sind and the Indus Valley. Exports from this port in 1906-7 (March 31) reached \$51,085,069, an increase of \$14,177,779 over 1905-6. They consisted of, chiefly, raw cotton, cotton seed, raw hides, rice (not in husk), seeds (rape \$5,510,000), skins, wheat (\$23,186,474), raw wool, chick peas, grain, barley, and animal bones. Rape seed exports increased 101 per cent in value over 1905-6. Smaller crops in Bengal and Burmah account for the four-fold increase in rice exports. In cotton seed the export increase was 512 per cent in value.

In spite of the plague keeping many native merchants and country dealers away the imports during 1906-7 fiscal year were the largest on record, and about 10 per cent more than in 1905-6. Sugar figured for \$5,958,062, supplied chiefly by Austria-Hungary, \$2,356,712 worth; Germany, \$1,637,639, and Java, \$1,084,056. Provisions, metals and manufactures decreased for 4 to 9 per cent. Considerable increase occurred in nails, hardware, building materials, tools, rails and plates, large increase (over 100 per cent) in kerosene, reaching 6,994,133 gallons worth \$1,026,539. Articles wholly and partly manufactured increased \$1,539,208 or 9 per cent. Yarns and textile fabrics totaled \$15,965,991, an increase of \$2,544,377. In all the imports footed up \$31,395,615, a net gain of \$2,253,000. In sheetings and drills, American makes suffered a loss of \$136,877. In the aggregate the American share of the port's total trade rose from \$1,658,510 in 1905-6 to \$2,676,121 in 1906-7 due to larger sales of kerosene and larger purchases of hides, skins and wool. Still the United States gets only 3.18 per cent of the total trade of the busy port of Karachi.

FRENCH LINE'S PROGRESS.

In a recent address to stockholders of the Compagnie Generale Transatlantique (the French line), Mr. Jules-Charles Roux, the president, gave the following interesting information showing the company's financial and physical progress:

"The fleet, being the most important of our tools, underwent thorough modifications and improvements. The gross tonnage from December, 1904, was 171,127 tons; December 31, 1905, 196,815 tons; December 31, 1906, 205,014 tons; December 31, 1907, 225,305 tons. In an interval

of four years our fleet has been increased 54,178 tons, a proportion of 32 per cent during that period.

"The average age of our steamers, which in 1904 was eighteen years, in 1905, sixteen, 1906 fourteen, has dropped to twelve years in 1907. The age of our fleet has, therefore, been reduced six years, that is, about one-third.

"In a word, the value of the ton which before the reduction of the capital (December 31, 1903) was 624 francs, 436 in 1904, 426 francs in 1906, is found to have been reduced to 383 francs December 31, 1907, which may be considered a reasonable price for a fleet composed, in a great part, of steamers of a very high cost price. Consequently, from 1903 to 1907, there is a difference as to the value of the ton of 241 francs, namely, a decrease of 38 per cent, notwithstanding the addition to the fleet of La Provence, of which the price of the ton is 1,040 francs.

"In 1907 there disappeared from the fleet 9,061 tons. There was added this year 29,661 tons, and there will be 52,600 additional tons next year.

"As regards our receipts, these have progressed as follows: 51,775,165 francs in 1904; 57,427,000 francs in 1905; 68,393,559 francs in 1906; about 72,000,000 in 1907, and as we have not made many more sea miles than last year, as our expenses will proportionately remain the same, we will be in a position to prove to our shareholders, when our next meeting takes place, that we have in no way forgotten the sacrifices they so courageously made four years ago."

GOVERNMENT STEAMSHIP LINE.

J. L. Bristow, who was appointed as special commissioner of the Panama railroad last August with instructions to report whether it was advisable to establish a government steamship line between Panama and United States ports on the Pacific coast, has made a report to the secretary of war in which he says that the weight of the argument is strongly in favor of establishing the service. He thinks a government line on the Pacific coast would be desirable for the transportation of canal supplies and materials and canal employes, for keeping open and improving the Isthmian route of commerce and for procuring cargoes for the Panama railroad for steamships' homeward bound from Colon. Mr. Bristow says that to perform the service required on the Pacific coast would necessitate the purchase of from six to nine ships at an estimated cost of from \$3,500,000 to \$6,000,000.

PRESERVATION OF PILING AGAINST MARINE BORERS.

The length of service of piles in wharfs and other marine structures is greatly shortened by the attack of marine borers, or ship worms. A method of protection, both efficient and cheap, is much needed, the more so because the timbers best suited for piling are becoming very scarce and are increasing rapidly in price.

Marine borers are found as far north as Maine and Alaska, though they are more numerous and destructive in the warmer water farther south. Since they require only a small exposed surface in order to gain entrance and completely destroy a pile, any effective means of preservation must protect the wood from high water mark to a point in the mud below which the borers do not go.

A number of excellent methods have been devised for protecting piling by external coatings or sheathings, any of which, properly applied, will increase the life of the pile. Three factors which decrease their efficiency are the corroding action of salt water, the wash of the waves which injures and often breaks the casing, and the dangers from floating timbers and debris. Thick iron cases resist damage from these sources for a long period, but they are very expensive.

The injection of preservatives through holes bored in the top of the pile, or near the mud line, has failed to secure a distribution sufficient to adequately protect the outer layers of wood. All soluble salts have also shown a tendency to leach out when exposed to salt water. Impregnation with creosote, a coal-tar product, has usually proved highly efficient with suitable kinds of timber properly prepared, when a sufficient quantity of good creosote is used.

The principal timbers used for piling are longleaf, shortleaf, and loblolly pine, and white and red oak on the Atlantic coast and Gulf of Mexico, and Douglas fir on the Pacific coast. Spruce, redwood, cedar, cypress, eucalyptus, and palmetto are used locally. All of these woods with the exception of palmetto are subject to damage by borers. Hardness is not a complete barrier to their attack, although boring is probably slow in dense woods. Southern pine and oak can be impregnated with creosote, and this promises to be one of the most efficient means of resisting the borers. It is probable that some of these timbers can be successfully treated by the open-tank process. However, if a heavy absorption is de-

Circular 128, just issued by the Forest Service, gives a detailed description of the most important marine borers and their habits, together with a discussion of the different forms of mechanical devices in use for the protection of piling and of protection by chemical preservatives. This publication will be sent free upon application to the Forester, Department of Agriculture, Washington, D. C.

Mr. Robert Curr, whose excellent articles on Lake Ship Yard Methods of Steel Ship Construction are now running in the MARINE REVIEW, has been asked by ship yard workers to write something on strength of materials and riveting. He complies as follows:

Figs. 1, 2, 3 and 4 show the midship section, belt frame, bulkheads in hold and watertight bulkhead in tank. The part of the frame riveted to the shell plating is composed of channel section and is in two pieces from the edge of the center keelson bottom angle to the spar deck.

the floor and has its flanges looking forward from the fore end to where the dead flat ends.



The top side channel runs from the fourth girder to the spar deck and lapping on the floor 18 in.

This top side channel has its flanges looking aft from the stem to the end of the dead flat of the vessel when it is turned the flanges looking forward; this makes an open bevel on the frame flange and facilitates the work and makes easy access in putting in the rivets for the shell plating.

In angle framing the riveting on the standing or inner flange is governed by the spacing of the rivets for the outer plating. In this case the arrangement of the riveting on the web of the channel is gone on without any reference to the shearing riveting whatever.

Care must be taken on the floor part of the channel that the timber holes do not come opposite the shell rivet holes in the bottom of the vessel.

Figs. 13 and 14 show the rivet holes laid off for all the pieces which go to make up a completed frame.

The connecting of the top side

BULKHEADS NO. 68-116
 LOOKING FORWARD.
 HORIZONTAL STIFF $6 \times 3\frac{1}{2} \times 15$ CHNNELS.
 VERTICAL
 PLATING 12.5" & 15"
 VERTICAL STIFF $6 \times 3\frac{1}{2} \times 15$ LUGGED TO TANK.

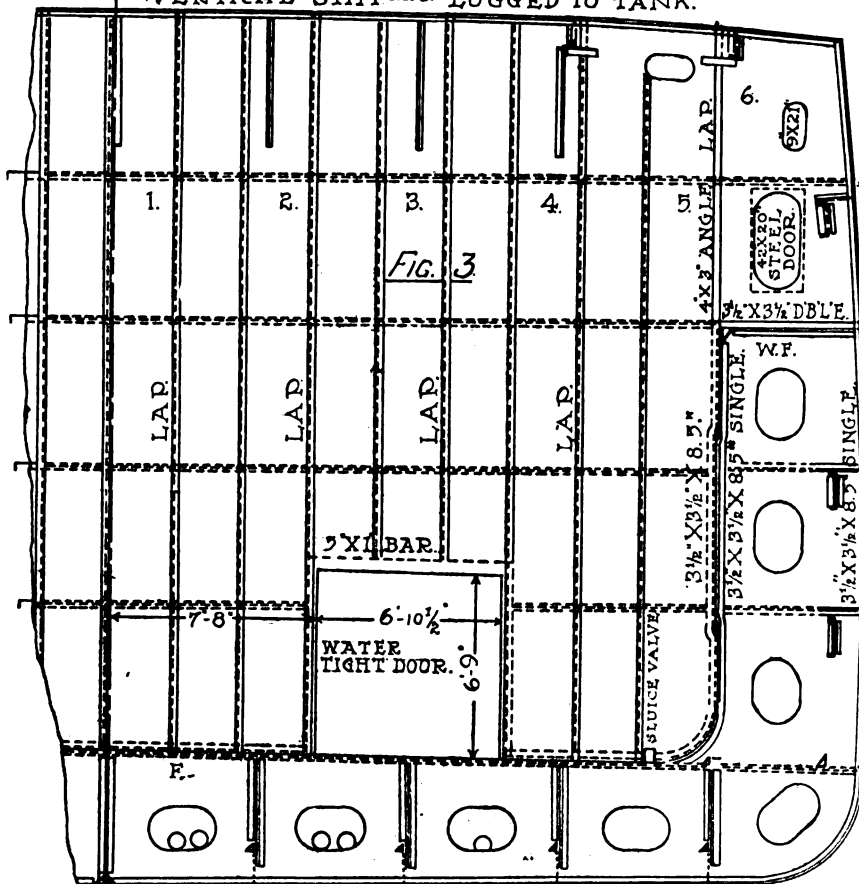


FIG. 3.

channel to the floor part is overlapped 18 in. long and connected together with twelve $\frac{3}{4}$ -in. diameter rivets machine riveted of the pan head and snap point type.

The first thing to be considered in making this lap butt connection is to consider the frame in one piece from the keel to the spar deck.

It would be very cumbersome to bend a frame 57 ft. long of this section and would not serve the purpose intended in marking same from molds.

The principal object in using molds for building ships on the lakes is to dispense with the one man monopoly and getting as many men as possible both skilled and unskilled on the work at one time.

To facilitate the work on the frame channel it is cut in line with the fourth girder, this line being the end of the straight part in the bottom of the ship or a point immediately before the turn of the bilge which runs the whole length of the dead flat of vessel.

This connection is simply considered a joint or butt more often used

in shipyard phraseology. The unavoidable weakest section governs all calculations of butt connections in a vessel.

The unavoidable weakest section is the line of rivet holes on a frame

extending from the keel to the spar deck as shown by midship section Fig. 1.

In order to know just what to do in arranging rivets for a butt connection the strength of the materials is necessary. In these calculations steel will be considered for all materials.

Tensile strength 28 tons per square inch for unpunched and 26 tons for punched at about 8 diameter pitch and 24 tons for punched at about 4 diameter pitch.

The punching of plates weakens the plate so that accounts for the difference of 2 tons per square inch between punched and unpunched plates.

The closer the pitch of rivets the greater the material is weakened.

The shearing strength of rivets the same as punched material of 8 diameter pitch 26 tons per square inch.

To find the strength of material the width of plate multiplied by the thickness by strength per square inch gives result for unpunched material.

Example: A plate $51'' \times \frac{1}{2}''$ thick
 $= 51'' \times \frac{1}{2}'' \times 28 = 714$ tons. A punched plate $51'' \times \frac{1}{2}'' = 25.5$ square inches. $25.5 - 3.659 \times 13-16$ holes punched out in plate = 21.85 square inches for punched plate. $21.85 \times 26 = 568$ tons for punched plate.

Shearing strength of $\frac{3}{4}''$ diameter rivet = $\frac{3}{4} \times \frac{3}{4} \times .7854 \times 26 = 11.486$ tons per rivet.

There will be no rebates, as hitherto, on first or second class return tickets by trans-Atlantic liners, and uniform saloon rates will prevail throughout the year.

...WATER TIGHT BULKHEADS IN TANK...
 ...BALLAST PIPES SEE TANK TOP PLAN...

FIG. 4.

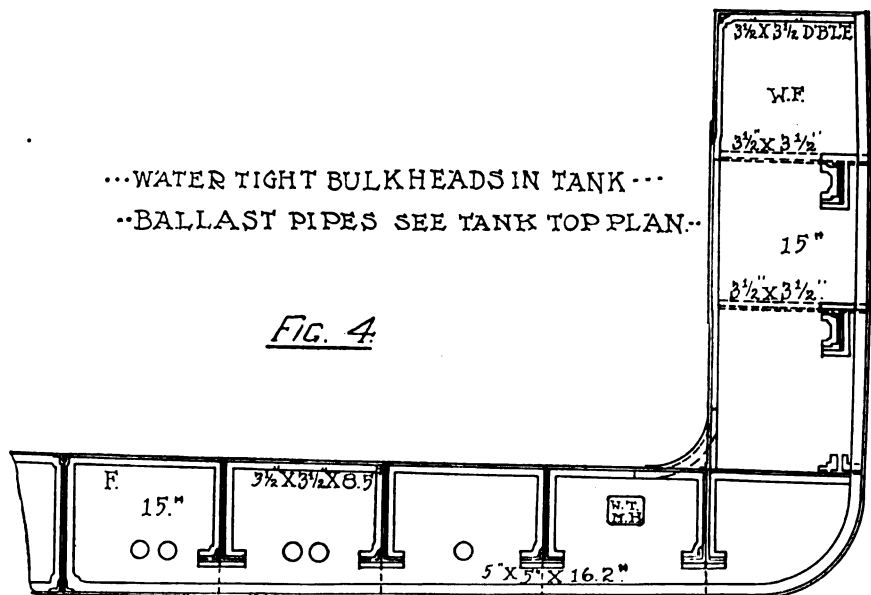


FIG. 4.

POOR SERVICE TO SOUTH AMERICA.

A prominent American who recently had occasion to go to Valparaiso on important business in a letter thus describes the poor service furnished by foreign vessels to South America:

"The first steamer sailed from New York on Sept. 7, and I reached

The accommodations are wretchedly inferior for passenger and mail service on the Pacific coast between Panama and Valparaiso. There are two steamship companies that control the traffic, The South American Steamship Company, Chilean, and The Pacific Steam Navigation Co., British. The companies have formed a com-

with traffic. Freight and passenger business on the line has doubled I am told in the last five years, and rates have also increased. It now costs \$210 American money for a ticket from Panama to Valparaiso, whereas the price 15 years ago was \$150. Both companies have so much trade that they can not handle

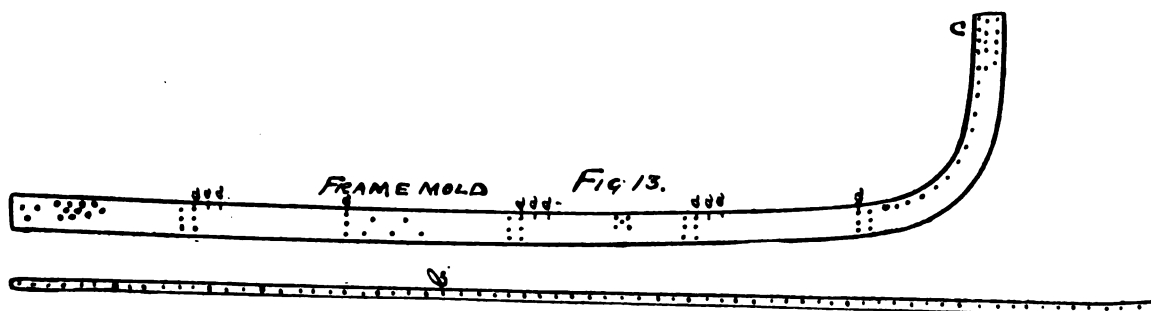


FIG. 13.

Colon on Sept. 16. The first steamer leaving Panama sailed on the 21st. You may understand the annoyance to which I was subject when I state that I was from Sept. 21 until Oct. 17, 27 days, in going to Valparaiso, a distance in round numbers of 3,000 miles. I was 41 days from New York to Valparaiso.

bination and they offer the poorest kind of service. In 1889 when I first came to this coast the trip from Panama to Callao was made regularly in nine days and now it takes from 14 to 16. Many of the same steamers are still in commission and naturally they are old, dirty and inconvenient besides overburdened

it and seem to be incapable of improving the service. Both are getting enormous profits and yet do not offer to the public as good accommodation as they did 15 years ago. When I went to the United States last May, I took an English ship, the Oronsa, that went south to the straits of Magellan, through the straits to the Atlantic and thence to Liverpool. Afterwards I sailed from Southampton for New York, and I made the entire trip, a distance of 13,000 miles, in exactly 41 days. By a strange coincidence, it took me exactly 41 days to come from New York to Valparaiso, a distance of 5,000 miles. The route via Europe was in clean, up-to-date steamers that wasted no time. The west coast trip was in very inferior steamers that made more than twenty stops, sometimes for three days at a time, for the purpose of picking up cargo. I cannot too strongly urge the necessity of some movement that will result in better steamship facilities on the coast. Improvement in American trade in these countries is practically impossible under present circumstances. If a good line of American steamers can be put on this route, it will revolutionize the conditions and bear rich fruit for American interests. I am informed the Hamburg-American Line is preparing to establish a new line of steamers on this coast. If it does, it will improve matters but will help German trade more than that of the United States."

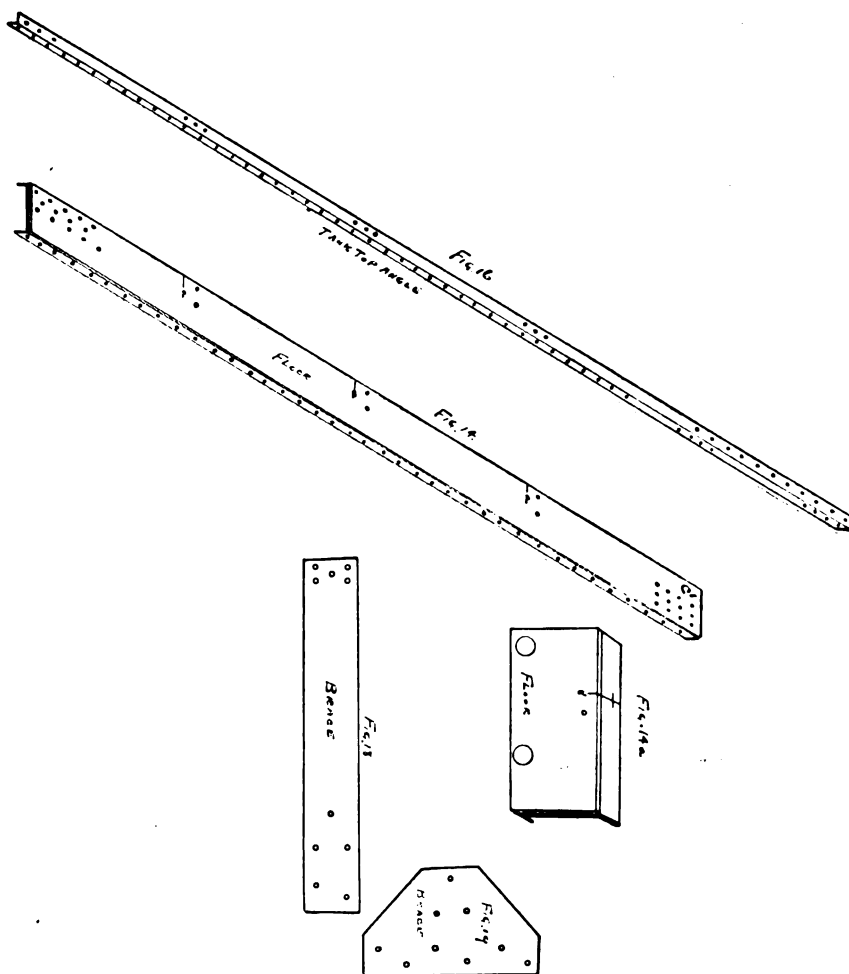


FIG. 14.

The Marine Railway, Machine & Boiler Works, Baltimore, Md., has been awarded contract for repairing lightship No. 72 on a bid of \$1,467.

THE HONORABLE PETER WHITE.

The *MARINE REVIEW* is now prepared to deliver the second edition of *The Honorable Peter White*, a biographical sketch of the Lake Superior iron country. The book deals with the discovery and development of the iron mines of the Lake Superior region. Its purpose is best told in the preface, as follows:

"This book is unlike any other in that it is really a romance though it deals with facts. There is no statement in it that is not the result of patient research. It has seemed best to write it while it was yet possible, for the information which it contains has been secured at first hand. The industrial supremacy of the United States among nations is due wholly to the purity, abundance, cheapness of mining and low rate of transportation of Lake Superior ores. There are living chronicles today of the early development of this region, men who as boys went into that country to develop it, then an unbroken wilderness, and from their lips the story has been secured. Obviously if not written now it could not, in a little while, be written at all. So vast indeed has been the progress since that it seems incredible that it should have occurred within the lifetime of one man. Yet Lake Superior, in a commercial sense, is only 50 years old. The beginnings, therefore, of this great iron industry are historically important and are of interest to every citizen in the United States, for there is not a man or woman today living who has not been directly or indirectly benefited by the great mineral wealth of the Lake Superior country and the labor of winning it and working it into the arts.

"It has seemed just also to incorporate the work under the title which has been given to it. Peter White, as a boy, assisted in stripping the first iron mine; he wrote the bill of lading of one of the earliest, if not the first, shipment of ore—only six barrels, it is true, but how prodigious has the stream grown since; and moreover he is still active in this great industrial theater. The first shipments of ore are traced through furnaces, refractory, rebellious and not easy to smelt, because the early furnaces were not adapted to it. The painful hauling of the ore to the shore of the lake in sleighs in the winter time and along a plank road in the summer time is depicted; the equally painful portage around the rapids of St.

Mary's river, to be loaded again upon tiny vessels; the tedious and expensive loading and unloading by wheelbarrows and gang planks; until in the course of time the portage gives way to the canal, the plank road to the most solidly constructed railways in the world, the wheelbarrows to the great docks with their pockets and chutes and the equally great automatic unloading machines; and the tiny vessels to a fleet of ships so large that ocean liners scarcely rival them and so numerous that over a waterway 1,000 miles long one is never out of sight of the other—and all this within a single lifetime."

The price of the book is \$2, postage 17 cents extra.

ROBERT CURR.

Robert Curr, naval architect and marine surveyor, who has been engaged for a year or more in looking after ship construction and repair work in various great lakes yards, has permanently returned to Cleveland and opened office at No. 1024 Rockefeller building. Through his business connections he is now able to undertake the supervision of both hull and machinery. Mr. Curr's experience has been of the most extensive character. He served an apprenticeship of seven years in the ship yard of Gourley Bros., Dundee, Scotland. He then went with the Clydebank Ship Building

with the Clydebank yard he spent two years with Harland & Wolff at Belfast, Ireland. He then accepted the position of foreman with the Raylton Dixon Co., Middlesborough, England. Incidentally he visited all the ship yards in Great Britain and Ireland during his residence there. Moreover, he had the advantage of a thorough training in Prof. Biles' Clydebank Science School. Mr. Curr came to the United States in 1900, and after a brief experience in Duluth entered the employ of the Cleveland Ship Building Co. During his stay there he constructed three tugs for the L. P. & J. A. Smith Co. on his own account, renting the yard of the Globe Iron Works for that purpose. These tugs were completed from the mold loft with the aid of a scribe board, the vessels being practically completed with the exception of the shell plating below the sheer strake. This was quite an original procedure for the lakes and attracted much attention at the time. For the past seven years Mr. Curr has been actively engaged in marine surveying in various parts of the country.

MR. CURR'S BOOK.

Mr. Robert Curr's book entitled "Lake Ship Yard Methods of Steel Ship Construction" is meeting with most gratifying success. This work is the only one of its kind in the United States and the sale indicates the lively demand that exists for it. The work is written in the every day language of the shipyards and is intended to be useful to the shipyard worker. A clear, every-day explanation is given of building a vessel from the mold loft floor. There is no other work extant which gives so much information upon this subject. Every piece of plate and shape is taken up and the method of laying off is explained from the keel to the mast.

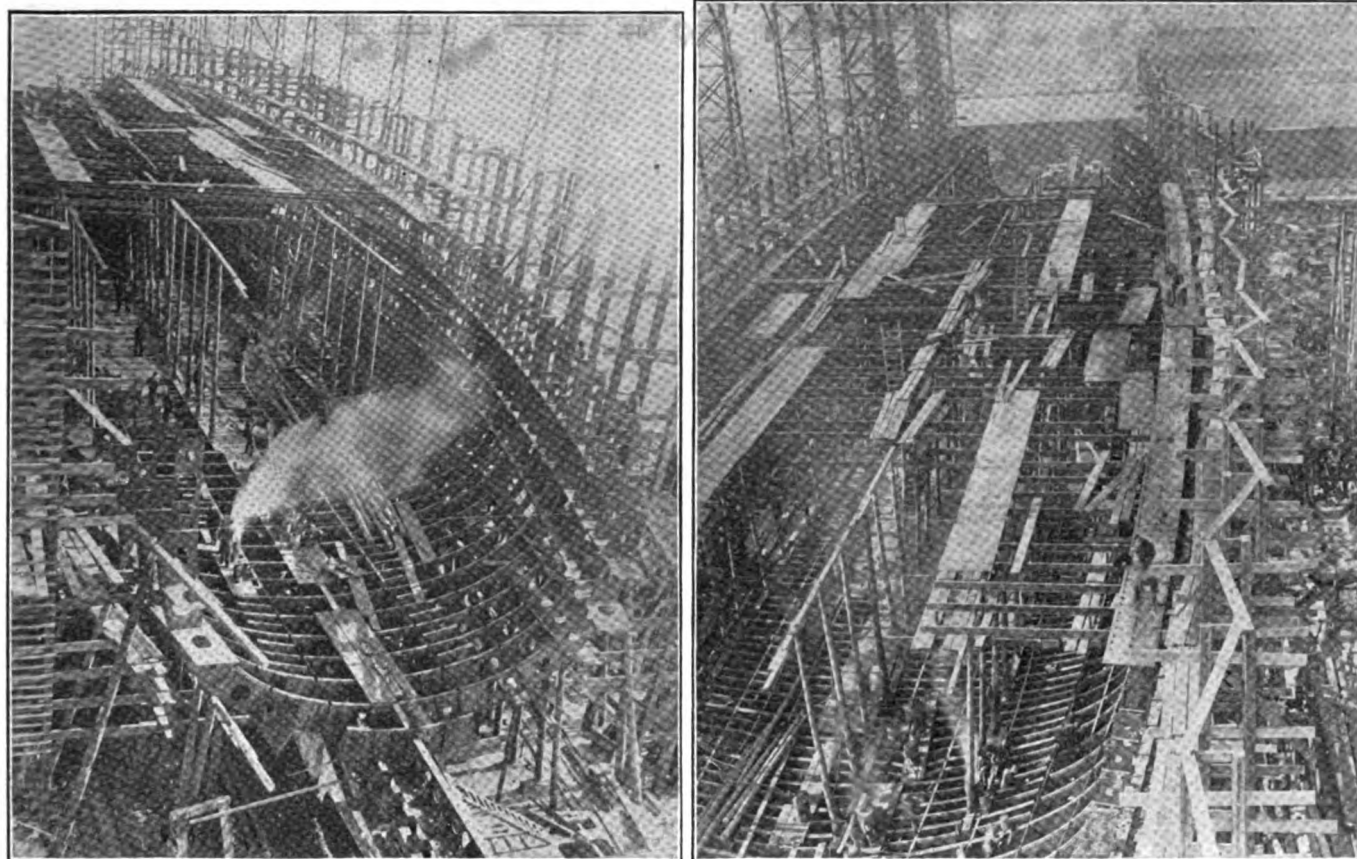
Joseph Supple, Portland, Ore., has been awarded contract for repairing lightship No. 50. This vessel was damaged by the Port Patrick, owned by Taylor, Young & Co., Portland, and the matter of repairs was arranged by this firm. The Supple bid was not the lowest, but the time clause entered largely into the decision.

The Pelly Dry Dock Co., Brooklyn, N. Y., is engaged in repairing the steamer Lassell, owned by McCauldin Bros., New York. She was recently badly damaged by stranding on the Florida coast.



MR. ROBERT CURR.

Co., where he remained for five years. This famous yard latterly constructed the *Lusitania*, though at the time of Mr. Curr's connection with it it was owned by James and George Thomson. At the conclusion of his service



VIEWS OF THE BATTLESHIP NORTH DAKOTA, TAKEN ON FEB. 10, 1908.

CURTIS TURBINE FOR JAPANESE WARSHIP.

Herewith are published photographs taken in the new extension of the machine shop at the Fore River Ship Building Co.'s plant at Quincy, Mass., showing 120-in. and 144-in. Curtis marine turbines in various stages of completion. The 144-in. turbine is intended for the Japanese cruiser of 23 knot speed. Two of the machines will be shipped during the latter part of this month to the naval

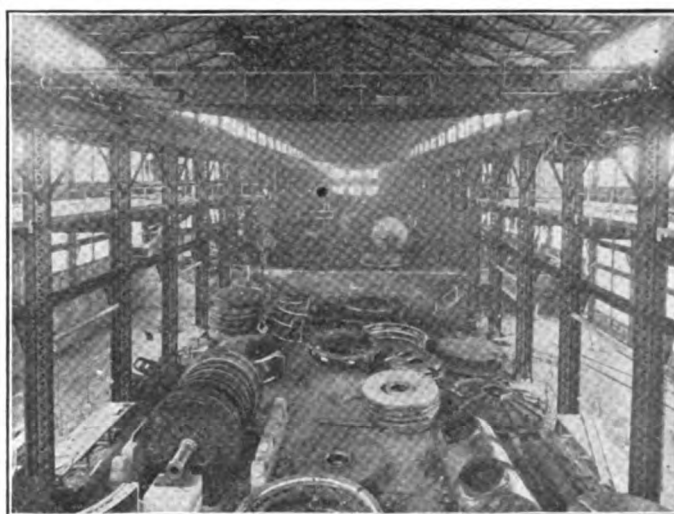
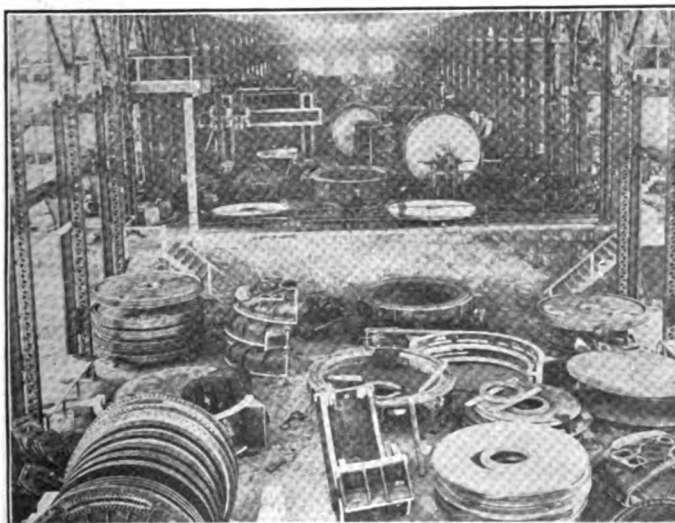
dock yard at Kure, Japan, via the Suez canal. The second pair of 144-in. turbines for Japanese battleship will not go forward until some time in August.

BATTLESHIP NORTH DAKOTA.

Herewith are published photographs of the battleship North Dakota taken on Feb. 10. The work during the past week was delayed somewhat owing to severe weather, but consisted of additional inner bottom and

shell plating, some protective deck plating, one bulkhead and a large amount of riveting.

The Shooter Island Ship Yard, Shooter Island, New York, has completed extensive repairs to the New York & Porto Rico Steamship Co.'s steamship Carolina. The boilers and machinery were given a thorough overhauling, constituting the heaviest job of this description ever done in the vicinity of New York.



VIEWS OF THE MACHINE SHOP, SHOWING 120-IN. AND 144-IN. CURTIS MARINE TURBINES UNDER CONSTRUCTION.

CONSTRUCTION OF LOCK 3, ERIE BARGE CANAL.

BY OSCAR HASBROUCK, C. E., IN THE *Engineering Record*.

Lock 3 is a good example of the general type of the miter locks used on the Barge canal. It is situated at Waterford, N. Y., and is one of the six locks, including the lock at the Troy dam, which constitutes the lift between the Hudson and Mohawk rivers against the 18 locks of the present Erie canal. It has the characteristic dimensions of 45 ft. between the face of walls, 328 ft. between hollow

and is mixed in six-bag batches, the average run for the day being 250 batches. It is then hoisted into place by derricks, three being able to take care of the total output though there are five in all, the others being needed to hoist forms and other materials when not in use for concrete. They are supplied with steam from a central boiler plant.

The floor of the lock was first constructed along the lines *b b* shown in the general section; this was laid in 16 ft. sections by setting templates to grade. The track was then laid over

The anchorages for the gates were supported on chairs at the right elevation and line before concreting began, as monolithic construction was required within certain limits. All other imbedded materials were suspended in position before their grade was reached.

The panel forms, which are the unique feature of the work, consist of planking nailed to studs, which are backed by two heavy timbers. The general size is 5 x 12 ft., though different sizes were used according to their purpose. The standard panel consisted of five 2 x 12 in. planking 12 ft. long nailed to six 3 x 6 in. studs 4 ft. 10 in. long, and these in turn bolted to 8 x 8-in. timbers 12-ft. long. The bolts were countersunk on the face of the studs and at the back on each end.

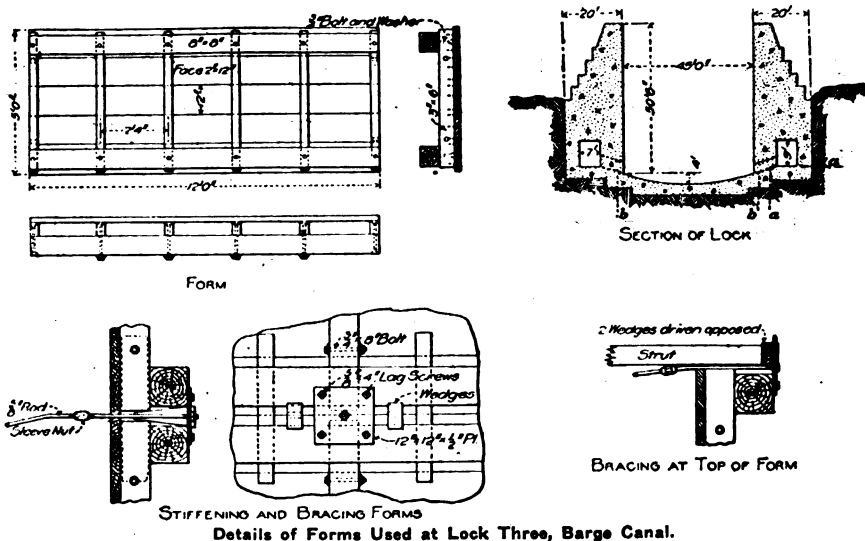
When in use these were set one on each other and held in place by wedges driven behind the 8 x 8-in. pieces and between them. They were also supported by being bolted to each other by two bolts and held in line by a 12 x 12½-in. steel plate at the corners, each plate covering four panels and held to them by four lag screws. Through the center of each plate there ran a rod having a sleeve nut at least 6 in. inside the form, at the back, it being bent down to the level of the panel below where it was fastened to the back form, an iron rod driven into the concrete, or a post imbedded in the concrete, according to whether it had a rock backing or not. The top was held to line by a wooden strut braced at the back against the rock, an imbedded post, or back form, and at the front against the upper half of the iron plate.

The panels were brought into line from a 2-ft. offset line with a transit, by either tightening the nut on the front of the plate or driving wedges, opposed to each other when necessary, between the end of the strut and the plate.

All curved surfaces were constructed by nailing ¾-in. ship lap over templates and holding it in place by rods and struts similar to the above.

The above method has worked very satisfactorily, no giving away of forms having been experienced. It is economical and is to be recommended for use in heavy construction.

The contracting is being done by the Ferguson Contracting Co. of New York, and the engineering by the department of state engineer and surveyor.



Details of Forms Used at Lock Three, Barge Canal.

quoins and 12 ft. of water on the miter sill, and it contains 31,000 cu. yd. of concrete. The difference in elevation between miter sills, or the lift, is 34.5 ft.

The water is fed into the lock by the main culvert well, which is located just ahead of the upper gate; from this it is led off into two culverts which run the length of both lock walls, having their intake above the upper gate and outlet below the lower gate. At the end of each of the culverts there are valves for filling and emptying the lock. From each culvert in the chamber walls there are 14 cast iron port pipes 3 ft. in diameter, spaced 19.5 ft. apart, through which the water finds an inlet and outlet from the main chamber. There are also other appurtenances, such as line hooks and ladders in the walls and capstans and snubbing posts on the lock walls.

The concrete is furnished by a Hains mixer situated about 500 ft. from the lock and transported by three trains of four cars each in Stuebner bottom-dump buckets, two to the car, to the site of the lock, one train being left in the lock. The mixture is a 1 : 2½ : 5,

this and the side walls commenced along the line *a a*, the grade being set to the floor of the culvert. As soon as the work had progressed sufficiently the port pipes were set and concreted in. At the same time the side walls were being constructed, the breast wall and head wall were carried up. The side walls were built up in 48-ft. sections, a tarred expansion joint being provided at the end of each. In all cases where a floor was to be finished off, the concrete was brought to that elevation and the part in question finished before work was resumed.

The culvert linings to which the valves are fastened were set by lowering the bottom plate in a soft bed of concrete and grout, and tamping them until they were thoroughly imbedded and rested on their flanges on blocks set to grade. When these had sufficiently set, the side plates were bolted on.

The miter sills were set to grade and line by resting them on small rectangular boxes, and the anchorages suspended from them. They were then concreted in, after which the boxes were removed and the holes filled.

STRONGER EXAMINATIONS.

Editor Questions and Answers Department:

I would like to ask a few questions, which I think are very timely: Why is it that the pilots and masters of today are required to know so much about navigation than those of several years ago? A man going up for a certificate now has to stand a pretty severe test, severe compared with the examination work of four or five years ago. He must know all these things in order to pass, and yet when he does pass the law places him on the same level, so far as his certificate is concerned, with the man that got his papers years ago without having to know these things. This does not seem right to me. It would seem to me that all pilots or masters should be required to pass the same examination and in order to equalize things they should be re-examined in all the new problems essential in lake navigation. I know a great many men holding a certificate that could not handle the examination work of today. They get along all right in their work, but they are only able to do it because of long years of experience, hardship and responsibility. Outside of the experience the man who knows navigation and how to practically apply it is able to make his work much easier and is more surer, and the shouldering of the great responsibilities is much lessened for him. Why is it that some boats are equipped with the pelorus and so many are not? I think the pelorus is almost the life of every boat itself and I cannot understand how a man can navigate his boat successfully without one. Why does not the government make it compulsory for all boats to carry a pelorus? They require a man to be proficient in the use of the pelorus and azimuths, and yet he may have a berth on a boat that does not carry one. If the pelorus is of such great benefit and use on one boat why would it not be beneficial on all boats? There are lots of such things that I cannot understand why the government does not see its duty to take hold of and improve or regulate.

A LATE DAY MASTER.

The editor of this department must frankly admit that there is a great deal of food for thought in the above correspondent's remarks.

The all-steel ship and large deviations, together with the changes in deviation due to the various trims of the hull, are some of the more important causes that have made navigation difficult and the consequent rea-

son that a higher standard of efficiency is required on the part of the men who navigate them.

It takes time to bring reforms about, and a beginning must be made some time, notwithstanding that it might or should have been done a long time before. The government is fast awakening to the importance of these matters more and more every day. The leading steamship companies have been looking at these problems in a different light, and in fact, it is to them that the credit belongs for many of the improvements now in vogue. The steamship owner demands safer methods in the handling and navigation of his property. He knows that the safety of the ship depends upon the efficiency of the man on the bridge.

It is only a question of a very short time that the government will make it compulsory for all boats to be equipped with the pelorus. It must come because the pelorus and azimuths have come to stay. A steel ship cannot be navigated successfully without the aid of azimuths. It is done but not with the correct degree of safety.

A CORRECTION.

A correspondent has been kind enough to call attention to a mistake in the example of a time sight for longitude at sea, published in the Jan. 30 issue. The mistake was simply in taking out the wrong cosecant for the polar distance. It should have been 0.01001 instead of 0.01082. Here is the way it should have been:

P. D.	102° 15' 32"	cosec.	0.01001
Lat.	28° 24'	sec.	0.05569
Alt.	25° 12'		
sum	2) 155° 51' 32"		
½ sum	77° 55' 46"	cos.	9.32039
	25° 12'		
	52° 43' 46"	sin	9.90080
		2)	19.28689
			9.64345 sine
			of apparent time at ship equals 8h
			31m 10s.
Gr. App. Time	8h 11m 33s	p. m.	
	12h		
	20 11 33		
	8 31 10	apparent	
time at ship			
	11 40 23	longitude in	
time.			
Long. equals	175° 5' 45"	W.	

RICHELIEU & ONTARIO NAVIGATION CO.

The annual meeting of the shareholders of the Richelieu & Ontario Navigation Co. was held at Montreal on Feb. 19. The financial statement showed gross earnings for the year to be \$1,305,004.14 and the net profit after providing for fixed charges, insurance, interest and depreciation, amounted to \$261,423.47. The operating expenses were 78.70 per cent of the gross earnings. Four quarterly dividends of 1¼ per cent amounting to \$39,150 quarterly were declared. The performance of the new observation steamer Rapids King which was especially designed for the rapids and which went into commission on June 15 last, has been so satisfactory that the directors felt warranted in recommending the early building of a sister ship to be called the Rapids Queen.

The officers and directors of the company are: President, R. Forget; vice president, Wm. Wainwright; general manager, J. C. Smith; secretary, F. Percy Smith; directors, George Caverhill, Wm. Hanson, L. J. Forget, C. O. Paradis, H. Markland Molson, Sir Henry Mill Pellatt, J. P. B. Casgrain, E. B. Garneau, A. Haig Sims.

DREDGE OWNERS AND LABOR.

The Dredge Owners' Protective Association has closed contracts with labor for the season of 1908, embracing dredge engineers and cranesmen, the licensed Tugmen's Protective Association, the tug firemen and linesmen and dredge workers. There is practically no change in general wage conditions, but the dredge owners gained concession in the matter of overtime. Last year the men would not work longer than the usual day and this year they agree to put in 16 hours overtime in a month, to be distributed as the owners see fit. Wages of the dredge engineers range from \$100 per month to \$2,500 a year; licensed tugmen from \$110 to \$165 a month; tug firemen and linesmen from \$55 to \$65 a month, and dredge workers from \$56 to \$66 a month. In every case there is an allowance of about \$20 a month additional for each man's board, as the dredge engineers need not board on the boat. If they elect to go home they draw 75 cents additional.

E. J. Tull, Pocomoke City, Md., is building a fishing steamer for the Morris & Fisher Co., of Virginia. The machinery will be furnished by the E. J. Codd Co., Baltimore, Md.



DEVOTED TO EVERYTHING AND EVERY
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CIATED WITH MARINE MATTERS
ON THE FACE OF THE EARTH.

Published every Thursday by
The Penton Publishing Co.
CLEVELAND.

BOSTON.....1053 Exchange Bldg.
BUFFALO932 Ellicott Sq.
CHICAGO1362 Monadnock Bldg.
CINCINNATIFirst National Bank Bldg.
NEW YORK1005 West Street Bldg.
PITTSBURG521 Park Bldg.
DULUTH411 Providence Bldg.

*Correspondence on Marine Engineering, Ship
Building and Shipping Subjects Solicited.*

Subscription, U. S. and Mexico, \$3.00 per
annum. Canada, \$4.00. Foreign, \$4.50.
Subscribers can have addresses changed at will.

Change of advertising copy must reach this
office on Thursday preceding date of
publication.

The Cleveland News Co. will supply the trade
with the *MARINE REVIEW* through the
regular channels of the American
News Co.

European Agents, The International News
Company, Breams Building, Chancery
Lane, London, E. C., England.

Entered at the Post Office at Cleveland, Ohio,
as Second Class Matter.

February 20, 1908.

DUTCH SUBSIDIES.

It is perfectly proper, of course, for other nations to subsidize their shipping, but it seems to be a very bad thing indeed whenever such a policy is suggested for this country. There is something very curious both at home and abroad about the attitude upon this subject. For instance, an English periodical can competently discuss the giving of subsidies to shipping by all nations except the United States. Whenever there seems to be a reasonable prospect of the American congress giving aid to its shipping, British periodicals unite to condemn it. There must be a reason for this and that reason probably is the inevitable encroachment upon British shipping that would result.

The Netherlands government has just rendered a subsidy to the Dutch South-American line for the specific

purpose of increasing trade between Holland and South America. The terms as given below are discussed by Fairplay. The contract is for fifteen years, the annual subsidy amounting to \$120,000 for the first five years, \$80,000 for the second five, and \$40,000 for the third five. It is quite probable that at the end of the fifteenth year the Dutch South American line will be in a self-sustaining condition. An interesting feature in the statement published is the increase in trade shown in the table between Holland and the river Plate:

"The committee entrusted with the task of reorganizing the (Dutch) Zuid-Amerika Lijn has finished its labors, and prospectus of the new concern, to be known by the name of 'Koninklijke Hollandsche Lloyd' (Royal Dutch Lloyd)—has been issued at Amsterdam. The committee, it appears, has concluded a convention with the government, according to which an undertaking is given to maintain a regular steamship service to South America from Amsterdam to Rotterdam, making 24 voyages in the year, with departures at intervals of about 15 days to Rio Janeiro, Buenos Ayres, and Santos and back, all of the boats to be of a first-class type. The government, for its part, engages to pay to the company a subsidy of 300,000 gulden per annum for the first five years, 200,000 gulden for each of the following five years, and 100,000 annually for the third interval of five years. All of the rights and privileges granted by the government to the committee are made over absolutely to the newly-organized company, which by consent of the Queen of Holland, has been registered under the above-named title. The fleet will, for the present, consist of six steamers hitherto worked by the Zuid-Amerika Lijn, namely, the Amstelland, Rynland and Zaanland, each of 5,400 tons, as also the Maasland (4,272 ton), Delfland (4,302 tons), and Eemland (3,770 tons); the three first-named boats are fitted for the conveyance of about 1,400 third-class passengers and 4,500 tons of cargo, besides bunker coals; each of the other three will carry from 6,500 to 7,000 tons of cargo. It is stated to be the intention, however, to order, without de-

lay, the building of a number of larger twin-screw steamers equipped for the first, second and third-class passenger trades and having abundant cargo space, a portion of which shall be fitted for cold storage. It is further set forth that the new undertaking will extend the service until it develops into a really first-class mail and passenger line, and will include in its itinerary the ports of Amsterdam and Rotterdam, Boulogne, Dunkirk, Corunna, Vigo, Lisbon and possibly other Portuguese ports, on this side of the Atlantic, and, on the other side, Bahia, Rio Janeiro, Soutoa, and other Brazilian ports, Monte Video and Buenos Ayres. The success of the new undertaking is considered to be assured, judging from the quantity of cargo carried by the boats of the Zuid-Amerika Lijn during the seven years of its existence, as shown by the following figures:

	To Argentina. Tons.	From Argentina. Tons.
1901.....	54,148	47,964
1902.....	72,662	72,372
1903.....	56,308	76,538
1904.....	68,711	89,509
1905.....	89,689	102,199
1906.....	120,367	117,375
1907.....	123,632	118,129

"These figures refer exclusively to the conveyance of merchandise by the Zuid-Amerika Lijn from Amsterdam and Dunkirk to Monte Video and Buenos Ayres and *vice versa*.

"The share capital of the newly-constituted company amounts to 20,000,000 gulden, 5,500,000 of which are now being taken up, and out of this fund 1,200,000 gulden will be reserved for taking over the assets of the old company. A 4½ per cent loan of 2,000,000 gulden will also be issued shortly."

PACIFIC MERCHANT FLEET.

The Boston Towboat Co., Boston, has offered to sell to the federal government for the Isthmian transportation service its steamers Tremont and Shawmut, which it built to operate in the over-sea trade on the Pacific ocean four years ago when there seemed to be a reasonable certainty that congress would assist American vessels engaged in the foreign trade. These steamers have struggled bravely against the subsidized steamers of Great Britain and Japan and have been operated continuously at a loss, the subsidies of their rivals being practically equal to the operating expenses of a round trip. With the transfer of these vessels there will

be only six steamers on the Pacific coast flying the American flag. There are three times as many American warships in Pacific waters now than there are American merchant ships, and if this patriotic nation can derive any comfort from that it is welcome to it.

NOVEL TYPE OF BULK CARGO SHIP.

The Michigan Alkali Co., of Detroit, has contracted with the Great Lakes Engineering Works of Detroit for the construction of a novel type of bulk cargo ship to be employed in the transportation of coarse crushed limestone of which the alkali company use large quantities in the manufacture of soda ash, from the company's quarries at Alpena, Mich., to their works just below Detroit. The designs have been worked out by Messrs. Babcock & Penton, Cleveland, and the ship will be 286 ft. keel, 306 ft. over all, 45 ft. beam and 24 ft. molded depth. A continuous double hopper extends all fore and aft through the cargo space, the cross section of the hopper having the shape of a flattened W with an extreme width of 39 ft., the extremities being carried vertically to the spar deck, thus forming high side tanks. Under the hoppers and above the double bottom, continuous steel belt conveyers are fitted, discharging at the forward end onto a central inclined belt conveyor which extends aft and upward through the spar deck and delivers to a third belt conveyor carried on a steel boom and arranged to swing to any angle with the ship and through a vertical angle of about 30 degrees. The two bottom conveyers and the central inclined conveyor are all driven by a 100 H. P. motor and the boom conveyor by a separate 30 H. P. motor. Current is supplied by a direct-connected generator in the engine room. Gates are spaced every 8 ft. in the bottom of hoppers to control delivery of material. The depth of water available at quarry restricts the load depth to 15 ft. and on this draught the ship will carry about 3,400 tons of cargo. There are 13 hatches spaced 12 feet centers and the loading arrangements worked out provide for a pocket trestle ashore with a spout to every hatch. It is figured to load the ship in about one hour without shifting. The unloading is calculated at the rate of 750 tons per hour with a safe margin.

The propelling machinery consists

of a triple engine 18 in., 29 in., 50 in., cylinder diameter by 36 in. stroke with two boilers 11½ ft. by 11½ ft. fitted with positive heated draft and for a working pressure of 180 lbs.

The usual equipment of auxiliaries including ballast pumps, electric light, steam steerer, steam windlass and winches is provided. It is expected to make a round trip between the quarries and the works every 48 hours with a safe margin. Altogether the new ship marks another step in the rapid handling of bulk cargoes which has been so highly developed on the Great Lakes. Delivery is promised for July. Two ships are, in fact, contemplated by the company, but the second will not be laid down until the first has undergone her trial. The first boat will be named Wyandotte and the second Alpena in honor of the two ports between which the boats will trade. They will be operated by the Wyandotte Transportation Co.

FREIGHT SITUATION.

There is practically no change in the situation relating to lake trade. No ore has been sold for 1908 delivery and no charters have been made for moving it. This affords a striking contrast to the conditions which obtained at the beginning of 1906 and 1907 when practically every shipper had sold all the ore that he cared to deliver and every vessel owner had contracted for all the ore that he cared to carry. The years 1906 and 1907 were the years of maximum record on the lakes, the 1907 ore movement reaching the enormous total of over 42,000,000 tons. Of this 42,000,000 tons practically half of it was carried in ships owned by the company that had the ore to move. Practically 20,000,000 tons were moved in chartered vessels. If there is to be a greatly reduced movement of ore during 1908 the hope of the independent vessel owner lies in the lateness of opening the active season. This is likely to be the course that will be pursued as there is an abundance of ore on Lake Erie docks which is moving to the furnaces very slowly. The storage capacity of the docks was practically exhausted when the season of navigation ended, and the movement from dock to furnace is perceptibly less this year than it has been for several years past. The necessity therefore does not exist for an early opening of navigation. On the contrary a late opening has a decided advantage.

CLARK WIRELESS.

The Clark Wireless Telegraph & Telephone Co. of Detroit will do a general business both by wireless telegraph and wireless telephone on the great lakes during the coming season. Francis B. Clark, vice president of the company, made a trip to Pittsburgh last week for the purpose of selecting a site for a wireless station in that city. It appears that the company has demonstrated its ability to communicate over land by wireless and will make a bid for the considerable business that is now being transacted between Cleveland and Pittsburgh in the iron trade. Mr. Clark, who was in Cleveland during the early part of the week, said that the station at Sault Ste. Marie would be ready for service by the opening of navigation. It is the intention of the company to also establish stations at Marquette and Duluth. Last season messages were transmitted from Port Huron and Detroit by Clark wireless with an efficiency of service which has never hitherto been reached on the lakes. The service was practically instantaneous. The company has established its Cleveland office at 410 Rockefeller building. The company makes an announcement elsewhere in this issue of its plans. It will be seen that during the winter the wireless telephone has been developed, Mr. Clark claiming that messages can be transmitted by his installation for a distance of over 15 miles. Overtures have been made to put the installation aboard the Corey and Cole of the Pittsburgh Steamship Co.'s fleet. The sphere of influence of the wireless telephone, however, is secondary to that of the wireless telegraph, vessel owners being especially eager that the latter service shall be perfected first of all. There is an undoubted field, however, for the telephone and the lakes are likely to see before the year is out decided improvements in the means of communication between the shore and the steamer.

M. Mitchell Davis & Son, Solomon's Island, Md., have another order for a tug, this one being from Capt. Vivian Philips, of Baltimore, Md., the tug to be 66 ft. 6 in. long, 16 ft. 8 in. beam and 7 ft. 6 in. deep. This firm also has on the stocks a 50 ft. yacht for Edward M. Fulton, of Catonsville, Md., and a tug for Angus Cameron, of Baltimore, which is 55 ft. in length, 14 ft. beam and 5½ ft. deep. Several other tugs have also been ordered from this enterprising company.

FOR THE LAKE MARINE

In this department hereafter will be found everything of current interest pertaining to Lake Navigation. Masters are advised to consult it weekly for information of interest to them; and owners are invited to use it freely for the promulgation of all announcements of a general nature. The Marine Review will be placed aboard every vessel having membership in the Lake Carriers' Association, representing a registered tonnage of nearly 2,000,000 tons, and can, therefore, be depended upon as a reliable courier to the entire fleet. It will reach every vessel in active service weekly. It is the intention to make this department complete so that at the end of the year it will be an authentic record which should prove of permanent and increasing value to owners and masters alike.

At the annual meeting of the masters of the Pittsburg Steamship Co. at the Hollenden hotel, Cleveland, last January, a medicine chest was adopted which, it is predicted, will speedily find its way upon all lake steamers. The old form of chest underwent practically no form of modification in its translation from salt water to fresh water. The old medicine chest was peculiarly designed to meet conditions obtaining on long voyages and therefore carried medicines for the treatment of fevers and other serious diseases. Lake vessels do not, however, have to cope with these diseases because if a man is stricken with a fever he can be put ashore at the next port. The lake medicine chest should be equipped with medicines and materials for the treatment of emergency cases, such as burns, scalds, wounds and broken bones.

Appreciating the incongruity of the old chest, Mr. Coulby directed Dr. Harold Wilson, of Conneaut, to get up for the Pittsburg Steamship Co. a medicine chest similar to that adopted by the Red Cross Society. This chest with its equipment was exhibited at the meeting of the masters and was unanimously approved by them and will be installed on all of the steamers of the Pittsburg Steamship Co.'s fleet by the opening of navigation. The chest is of aluminum, divided into compartments, and takes up very little room. Mr. Coulby invited Dr. Wilson to explain the contents of the chest to the masters, and he did so in the following language:

ADDRESS OF DR. WILSON.

"Mr. Chairman and Gentlemen, the question of medicine chests has been quite a study on my part during the past summer from the fact that your president has asked me to look into the subject. I find among many of you who carry supplies that sometimes you go amiss, and possibly it is due to the hand book that is furnished to you by the government, which is too elaborate. It touches upon conditions, many of which you men must never con-

tend with. It has been arranged for deep sea going vessels. Most of the cases which you meet are simply those arising from accidental origin, and upon some of the most important, I will give you a few useful hints. The most serious cases you meet with are those of burns and scalds. (You may be called aft where a poor fireman has been scalded with steam so badly that his clothing is adhering to his skin.) Captains, remember this one point—if you have a bath tub on board your ship, fill it partially full of tepid water and immerse the patient up to his neck, clothes and all, so as to exclude the air from the wound, and thus reduce the pain. In minor cases when practical, immerse the part to give momentarily relief and apply burn lotion from case. Apply lotion on gauze or lint to part. When the burn or scald is not severe such as where the skin becomes reddened, a nice thing to use is just ordinary cooking soda. Take a handful of it and throw into half a bucket of water and it makes almost a saturated solution which you can apply to the burnt area. The secret in taking care of emergency cases is cleanliness. When you get a lacerated wound that is bleeding, science has taught us that the most dreaded thing is the infection from the external side of the house. You may think your hands are clean, you may think the ordinary linen that you take from your home may be clean stuff to use on a wound, but it is not. The process which this dressing must go through before a surgeon will touch it—it is put under sterilization, that is, it is practically baked at a temperature of 250 degrees for several hours thereby clearing it of all foreign organisms or bacilli that might exist within the dressing, and with this idea in mind I have had arranged a case here where the contents of every package which you need in an emergency is sterilized. This package as you open it (opening the package as he talked) has been subject to a temperature as I said before of 250 de-

grees, and thereby becomes sterile. Before we go on with further explanation I wish to explain a few dressings. Now, the first thing that we contend with in emergency cases is hemorrhage, or bleeding. Bleeding, in fact, is a very serious thing. Before approaching a case of laceration where hemorrhage exists, remember what I have said before, gentlemen, approach these cases as clean as possible. If you have a little water at hand and some good soap, ordinary laundry soap is all right, with lots of lye in it, wash your hands thoroughly and then go to your case and take a piece of the gauze. This gauze is arranged in one-yard packages (illustrating by pulling the gauze from one end of a package) and is used to cover lacerations and such injuries where there is hemorrhage; where it is applied direct to the wound. Most of you have been using cotton. The great trouble with cotton is that when the case goes into the hands of a surgeon, he has got to sit down with his pliers and pick every little piece of cotton out of that wound. Remember, take a piece of gauze from this package and apply it direct to the wound; then take a piece of cotton which is used for absorbing the serous discharged, and lay over the gauze. The purpose of the bandage is simply to hold on or retain the dressing in position. Many of you, no doubt, take hold of a bandage and put it next to a wound but we never do. You apply gauze to the wound and cotton on top of that, then use your bandage to retain the dressing. This same thing applies to burns. For these you can use gauze or if not you can use a piece of lint. In minor burns if you haven't anything else at hand, use ordinary cooking soda, which you can get from the steward, putting it in a pail of water and apply to the burnt part. Aside from this, I have made up a lotion consisting of what is known as ichthyol, just a 20 per cent solution in alboline or liquid vaseline, so when you meet a burn case you can open your can and pour directly onto the burnt surface. Apply your lint or gauze, then your cotton and hold your dressing in position with the bandage. Many mistakes are made among you where a man has met a serious injury or a laceration, of a hand or limb where the member is left dangling. A good thing to aid you is to pick up a piece of wood and cover it with cotton, but remember do not put the cotton next to the wound but put the gauze next to it. The use of a splint with the bandage

will free a man a great deal from pain by keeping the parts at rest. Many lacerations which you meet sometimes are minor and a bad thing to do is to take a piece of adhesive plaster and seal it up. Possibly the wound has been infected, that it contains the elements of blood poison; so leave the interval between the strips of adhesive plaster where the serum or discharge of the wound may get out; over this apply gauze and bandage.

"Now, in regard to the various medicines which I have selected here, they consist of simply those useful things that you use about your household, and with which most of you are familiar.

The compound cathartic pill is used the world over as a laxative. Many times you meet a case wherein a person is constipated, give them one as laxative and three as a purgative. Now, you don't need a wide array of medicine, because the more you get the more complicated your case becomes, the same way with the migraine tablets; this is composed of camphor, acetanilid and quinine, and is used by the profession at large for headache. Use them according to directions.

"Then comes your quinine pills—everybody knows what quinine is good for. It is an anti-malarium, reduces chills and fever and it can be used as a tonic. One of the most important cases of sickness which you must contend with on your ships, among sailors, is what we call sailor's colic, cramps. This condition is brought about by a man going ashore and filling up pretty well with



DR. HAROLD WILSON.

liquor; he does not eat anything; until he gets on to a ship, which goes out in the lake and possibly in a bay and possibly not until three days he has the cramps. There is nothing that will aid this man outside of morphine. Therefore, I have prescribed a solution here that is recommended and is known as chloranodyne. (Specific directions will be found on every bottle in your medicine chest.) Now this chloranodyne preparation carries with it one-eighth grain of morphine to the dram or teaspoonful. You can give a patient one-eighth of a grain of morphine, or teaspoonful of it, taken about every hour for three hours, and then stop. After that, give him a teaspoonful every three hours if he does not improve; and as I have said before specific directions will be put on these bottles so you will be able to see at a glance just what to do.

Now, besides this, I propose to put on to the inside of the lid of this case full directions so you may have at hand for reference when necessary a little outline of what to do in an emergency. If you have hemorrhage, instructions will be there; if you have a scald or burn, it will tell you what to do.

"Now, of course, gentlemen, I can't go along and describe what to do in all emergencies as they are so varied it is impossible, but I will do what I can to enable you to give such temporary aid as you can until the case can be gotten to medical attention. Of course, you are close to the various harbors where you can go and secure

aid and the most cases you will have to contend with are simply those of an accidental nature.

"Now if there is anything, gentlemen, you would like to ask about I will be glad to discuss it."

DISCUSSION ON DR. WILSON'S SPEECH.

Capt. Hunt—Doctor, how do you get the clothes off the fellow in the bath tub?

Dr. Wilson—That is a good thing and I will answer it. You take these serious burns where you must immerse a man under water to relieve him, you can keep him there 24 hours if you keep his head above water, and after he finds out how good it feels, he will beg you to leave him in, and you can soon get him into some harbor. Keep the water tepid. If you desire to remove clothing under water

cut around where parts adhere. Do not tear off.

Now, I will tell you another thing that comes to my mind; a great many men who have accidental injuries to contend with, especially hemorrhages, and who are not posted in surgery, the first thing they do is to give a man a drink of whisky. Now, gentlemen, that is wrong for this reason, where you have a severe hemorrhage, you have the heart as a double force pump, pumping blood through the circulation where the resistance has been lessened, and when you give a man a glass of whisky, you just whip up that pump and you may kill him. Just leave him alone if he is seriously injured; don't try to do too much. Lots of times things are done which just upset the ways of nature.

In behalf of the stretcher question, I have arranged a stretcher for you to use on the ships which is a very similar one to the mine stretcher, used to elevate injured men from the shaft of a mine, and although it is somewhat difficult to understand it, it has straps and adjustments so you can lay the patient down and when you strap him in, as I will illustrate to you later, you can take a line and attach to the stretcher and lift him out of the hold. (One of the captains spoke of using a cot satisfactorily in an injury case on his boat.) In regard to a cot, if you have to convey a man very far, the best thing to confine him on is something solid, for a cot, on account of the woven spring, teeters, and if you have a broken leg and you cause that man to teeter I will tell you it is pretty painful. I think you will fall in love with our stretcher when you see it.

Of course, we usually take a man with the delirium tremens and feed him on whisky and use on the side a little morphine. While we are talking on this subject—the way we do that usually is to take a bottle of good whisky and for every half ounce you take out, put a half ounce of water back, so that by the time the whisky is gone, he won't be wanting any more.

Mr. Coulby—You have heard what Dr. Wilson said, gentlemen; are you all in favor of adopting this medicine chest?

(Moved by Capt. Allen; seconded; unanimously carried.)

Dr. Wilson—I meant to say, gentlemen, in bad cases of hemorrhage where you get a severe laceration, remember that the way hemorrhage

is stopped is purely mechanical. If you have a bad laceration on the fore arm and it is bleeding severely, just take a pocket handkerchief and pass around the arm above the wound, put in a lead pencil or something of the sort and tighten it up. Where you have to hold a man in this position for several hours or possibly a day, be sure you don't get it too tight, even if it bleeds a little and will clot.

Capt. Parke—Dr. Wilson, just at this point, in case a man should fall into the hold while we were out in the lake and his skull be fractured with a small hemorrhage there, wouldn't you advise leaving that open?

Dr. Wilson—Well, there is no way in which you could block that hemorrhage except by stuffing up between the bone with a little gauze or something. I would advise you, though, to try to block that. Of course, the gauze must act as a wick and gives a chance for the external air to act upon the blood which is contained in the gauze and thereby will stop it.

The stretcher was then brought into the room and explained, Capt. W. W. Smith acting as demonstrator. The advantages of the stretcher over the ordinary folding kind were so obvious that the captains voted unanimously for its adoption, Mr. Coulby emphasizing the fact that the company desired to do everything possible to alleviate suffering from accidental injuries received aboard the ships.

Since the meeting closed the company has given contract to the Conneaut Drug Co. for the medicine chests and to the Pond Lumber Co. of Conneaut for the stretchers.

CENTER RANGES.

Editor MARINE REVIEW, Sir:—I have read with much interest the letters printed in regard to the abolishment of the center range. I do not believe it would be very wise to remove the center range, unless they established a double range, like the one on Isle Aux Peches. I believe more collisions occur from boats getting too near the channel bank than from keeping too near in the center. I think if all used a little more precaution in meeting they would pass safely. After the new channel in the Soo River, is opened there will not be many places where it will be necessary to keep the middle. I believe this matter having so much wide-spread discussion will be pro-

mulgative of good results.

The fellow who sailed twenty years without an accident should be congratulated; that is, if he always kept the middle. In this period of congested navigation we should always keep a good lookout ahead, and get our vessel in position to meet all circumstances. We all understand how dangerous it is to try to pass a boat bound in the same direction in narrow and shallow water, and all should try to abolish the practice.

A. CISCOE.

Henderson, N. Y., Feb. 15.

DULUTH HARBOR RULES.

Editor MARINE REVIEW:—After a careful consideration of all the replies to my circular letter of Jan. 18, 1908, I deem it advisable to let the present harbor rules in the Duluth, Minn., district remain as they are. In other words it has been decided to make no recommendations whatever looking toward any changes in the rules with reference to vessels passing the various bridges.

Duluth, Feb. 18.

GRAHAM D. FITCH,
Major, Corps of Engineers.

IN LAKE SHIP YARDS.

The schooner Santiago, which was abandoned to the underwriters last summer as a constructive total loss, does not now appear to come under that definition. Capt. C. E. Benham, representing the owners, and Capt. J. P. Tuttle, representing the underwriters, have held a survey upon her and have placed the damage at a little over \$22,000. The Santiago was insured for \$60,000 and the repair and wrecking bills would have to amount to \$40,000 in order to make her a constructive total loss. The Santiago sank at Escanaba while taking on a cargo of ore. She was towed to Milwaukee and later taken to Toledo where she was unloaded and placed in dry dock. She will be repaired at Toledo.

The steamer Wm. E. Reis, which was sunk in the St. Clair river last fall, has been floated out of the dry dock at Ecorse and the John W. Moore has taken her place in the dock. Repairs upon the Reis are not yet complete but she will be ready well before the opening of navigation. Her repair bill will be approximately \$100,000.

The steamer Moore, which was sunk in collision in the Detroit river last fall, will require an entire new bow as well as other repairs. She was abandoned to the underwriters as a constructive total loss but a survey will be held upon her to determine the extent of the monetary damage.

Edward Gaskin of Buffalo will represent the owners and F. C. Workman of Milwaukee the underwriters.

DEARBORN DRUG & CHEMICAL WORKS.

Robt. F. Carr and several of his associates in the Dearborn Drug & Chemical Works, have purchased the holdings of the estate of the late Wm. H. Edgar, who died two years ago, and at a meeting of the stockholders, followed by a meeting of the directors of the company, the following officers were elected:

Robt. F. Carr, president, and general manager; Wm. B. McVicker, vice president and eastern manager; Grant W. Spear, vice president; George R. Carr, vice president; J. D. Purcell, assistant general manager; W. A. Converse, assistant secretary and chemical director; R. R. Browning, assistant treasurer; A. E. Carpenter, superintendent.

C. M. Eddy's holdings were also taken over, he desiring to devote all of his time to his personal business interests.

Robt. F. Carr became connected with the Dearborn company very soon after it was organized, entering the business shortly following his graduation in chemistry from the University of Illinois, in '93; for the past 10 years he has been vice president and general manager of the company, and during most of that time, especially the last few years, has been actively in charge of the business and organization.

Wm. B. McVicker has been connected with the company for 13 years, having during most of that time been at the head of the eastern department; and for several years he has been second vice president and eastern manager, having charge of the general eastern offices at 299 Broadway, New York, and the eastern branches reporting to New York, including Havana, Cuba.

G. W. Spear, who is a graduate in mechanical engineering, University of Illinois, entered the business in '95. He has been one of the vice presidents of the company for five years, in charge of the branch offices in the central district of the United States, having his headquarters at the general offices in Chicago.

George R. Carr has been connected with the company since he graduated from the University of Illinois, in chemistry, in 1901. He has occupied the position of assistant general manager of the company for the past four years, devoting his time largely to the railroad department of the business.

W. A. Converse, who was elected to the position of assistant secretary, in addition to the office of chemical director, which he has previously held, has been in charge of the laboratories for the past 12 years. Mr. Converse's ability as

a chemist is well known. He has been secretary of the Chicago section of the American Chemical Society for a long period.

J. D. Purcell, the new assistant general manager, has represented the company in the railroad department for five years.

R. R. Browning, assistant treasurer, has held a similar position for some years, having been with the company since 1896.

A. E. Carpenter, superintendent, has had charge of the manufacturing department for many years, and is the oldest employe in the service of the Dearborn company.

The preparations manufactured by the Dearborn company for the treatment of boiler waters, both in stationary and railroad service, are most generally used. The scientific methods originated by their laboratories, of treating each water individually, as per requirements after analysis, has made it possible for Dearborn preparations to give the highest efficiency with all classes of boiler feed supplies.

LUMBER RECEIPTS OF THE TONAWANDAS.

The receipts of lumber for the Tonawandas were lower in 1907 than in any year since 1888. This is attributed to the break in the Erie canal at Syracuse which suspended traffic for two months, wholesalers being unwilling to bring down stock which they could not forward to customers east and which would have to remain piled in the local yards. After the accident at Syracuse few shippers moved forward any stock except what was absolutely necessary under their contracts with producers. The decreasing output of white pine at upper lake ports is also given as a reason for the decline in receipts, but this is regarded by lumber interests as a secondary cause. Receipts would probably have equalled those of 1906 but for the canal accident.

The following figures show the total receipts of lumber stock by seasons since Tonawandas became known as a lumber market:

Year.	Feet.
1907	331,331,965
1906	442,509,592
1905	465,139,603
1904	414,806,940
1903	458,555,122
1902	406,922,933
1901	451,596,420
1900	409,728,377
1899	541,576,959
1898	476,066,136
1897	601,376,450
1896	489,675,500
1895	421,372,000
1894	406,538,000
1893	430,249,000
1892	498,055,000
1891	505,512,000
1890	718,650,000
1889	676,017,200
1888	269,522,200
1887	501,237,850

1886	505,425,000
1885	498,361,400
1884	398,871,052
1883	493,268,223
1882	433,241,000
1881	415,070,913
1880	323,370,814
1879	250,699,043
1878	206,655,122
1877	221,897,077
1876	207,728,227
1875	155,384,805
1874	144,754,000
1873	104,999,000

HUTCHINSON & CO. APPOINTMENTS.

Capt. Charles L. Hutchinson has announced the following appointments of masters and engineers for the fleet of vessels operated by him:

Steamer.	Captain.
J. J. Sullivan,	Wm. P. Benham.
D. R. Hanna,	S. B. Massey.
Joseph G. Butler Jr.,	James Murphy.
John Stanton,	Charles A. Heaton.
Wm. A. Paine,	Emil Dettels.
John A. McGean,	Charles A. Benham.
Martin Mullen,	U. S. Cody.
J. T. Hutchinson,	J. A. Logan.
Bge. Abyssinia,	T. K. Woodward.
Steamer.	Engineer.
J. J. Sullivan,	George Blauvelt.
D. R. Hanna,	W. J. Swain.
Joseph G. Butler Jr.,	W. G. Thorne.
John Stanton,	Anton Rudd.
Wm. A. Paine,	John Clark.
John A. McGean,	P. F. Lyons.
Martin Mullen,	George Oldman.
J. T. Hutchinson,	P. Wilson.

OBITUARY.

Capt. Charles Christie died at his home in Erie last week from the results of a stroke of apoplexy. Capt. Christie has spent 32 years in the service of the Anchor line, entering the employ of that company in 1875 as first mate of the old passenger steamer China. He was promoted to the command of the steamer the following year. He commanded many of the best ships in the Anchor line and his reputation as a navigator was not excelled on the lakes. Capt. Christie was 62 years old and is survived by a widow and a daughter.

Capt. John B. Peterson died at his home at Port Colborne, Ont., last week. He was a well known lake captain.

Frank Ouellette, marine engineer, died at his home at Marine City last week. He had been ill all fall.

PERSONAL.

The firm of Graves & Stephens has been dissolved by mutual consent, E. M. Graves having purchased the entire interest of D. C. Stephens in the business and assumed all its liabilities.

Capt. W. S. Shay of Ogdensburg will bring out the new steamer Bennington, which was built by the Great Lakes Engineering Works for the Rutland Transit Co.

NAVIGATION AT SEA.

What is considered a day's work at sea?

A day's work at sea is the calculation of the ship's latitude and longitude by dead reckoning. This is based upon the latitude and longitude left and the courses and distances sailed to find the latitude and longitude in. This is also called a traverse and is worked by middle latitude sailing. Dead reckoning does not take into consideration unknown currents, errors in variation and deviation, leeway and other influences that the navigator has to contend with. The difference between the ship's position by observation and by dead reckoning is called the drift or current, though it may be due to any of the above named influences. The position by dead reckoning simply gives the ship's position approximately and is used as a check on the position by observation, or one is a check on the other either way. Dead reckoning, as its name implies, is dead, but, nevertheless, serves its purpose.

Calculating each noon the course and distance made good during the past 24 hours is commonly known as the day's work. Strictly speaking, the day's work includes the finding of the ship's position both by dead reckoning and by observation.

Example:—A ship in Lat. $20^{\circ} 30'$ S, Long. $80^{\circ} 45'$ W, at noon Aug. 18, 1907, sailed till 8 a. m. Aug. 19, as follows:

See Fig. 1.

About 8 a. m. the 19th observed altitude of the sun's lower limb $20^{\circ} 57' 30''$, I. E., plus $3' 30''$, height of eye 21 ft., Wt. 8h 04m 20s, C-W is 5h 15m 10s, chronometer slow 5m 30s. Compass bearing N 61° E, ship's head S 28° W, Var. 13° Ely, Dev. 8° Wly. Ran this course for 34 miles when observed a meridian altitude of the sun's lower limb $55^{\circ} 07' 30''$, index error and dip as above. Required:

The Lat. and Long. in at noon by D. R.

The Lat. and Long. in at noon by observation.

The course and distance made good since preceding noon.

Set and drift of current during preceding 24 hours.

Compass error, and deviation for ship's head.

Example worked out in full:—

See Fig. 2.

Lat. and Long. left at noon Aug. 18:	
Lat. left $20^{\circ} 30'$ S	Long. left $80^{\circ} 45'$ W
Diff. Lat. 1° S	Diff. long. $30'$ W
Lat. in $21^{\circ} 30'$ S	Long. in $81^{\circ} 15'$ W
$20^{\circ} 30'$	

2)42°
Mid. Lat. 21°

A departure of 28 miles in Lat. 21° equals $30'$ diff. of Long., hence, the ship changed her longitude $30'$ (west).

Lat. and Long. at 8 a. m. the 19th by dead reckoning:

Lat. $21^{\circ} 30'$ S, Long. $81^{\circ} 15'$ W.
Course made good from noon of the 18th to 8 a. m. of the 19th, S 27° W 67 miles.

From 8 a. m. of the 19th to noon of the 19th ran 34 miles true S 33° W. This gives a diff. lat. of $28.5'$ S and a dep. of $18.5'$ W.

Lat. in 8 a. m. 19th	$21^{\circ} 30'$ S
Diff. Lat.	$28.5'$ S
Lat. in at noon	$21^{\circ} 58.5'$ S by D. R.
	$21^{\circ} 30'$
	2)43° 28.5'

Mid. Lat. $21^{\circ} 44' 15''$
A departure of 18.5 miles in lat. 22° equals a diff. of long. of $20'$.
Long. in at 8 a. m. 19th $81^{\circ} 15'$ W
Diff. Long. $20'$ W

Long. at noon by D. R. $81^{\circ} 35'$ W
Long. in at 8 a. m. by observation 81° W.
Long. carried forward from 8 a. m. to noon after steering S 33° W true 34 miles; long. changed in the interval $20'$ W.
Long. by obs. at 8 a. m. 81° W
Diff. Long. $20'$ W

$81^{\circ} 20'$ W. at noon by D. R.

See Fig. 3.

THE MERIDIAN ALTITUDE.

Long. at noon $81^{\circ} 20'$ W equals 5h 25m 20s, so that apparent noon at ship the time at Greenwich is that number of hours after noon; 5h 25m 50s equals about 5.4h.

See Fig. 4.

In lat. 22° a diff. of long. of $15'$ gives a dep. of $14'$, or miles.

Diff. lat. $19'$ and dep. $14'$ is found under angle 36° and distance 24, therefore, the set and drift of current in preceding 24 hours is N 36° E 24 miles.

The lat. by D. R. being S of the lat. by Obs., the ship has been carried N. of her supposed position; and also, as her long. by D. R. is W of the long. by Obs., she is E. of her supposed position; hence, the drift has been N. and E.

See Fig. 5.

QUESTIONS FOR MASTERS AND MATES.—NO. 59.

770. How do you find sidereal time at ship?

771. Knowing sidereal time at ship and the sidereal time of a star or of the sun, how do you find the hour angle of the body?

772. What is meant by the hour angle of a celestial body?

773. The sidereal time at ship is 18 hours and the sun's sidereal time is 15 hours, how much and which way is the hour angle?

774. If the sidereal time at ship is 8h. 20m. what is the hour angle of the star Sirius?

775. Why is it that by adding the sun's right ascension to apparent time that it gives sidereal time?

776. Why is it that when the hour angle is less than 12 it is W and more than 12 it is E?

777. In which part of the sky would you look to find the star Dubhe?

778. How can you determine whether a star is circum-polar?

779. If a star has a greater declination than your latitude and both are of the same name, will the star rise and set in your latitude? In which part of the sky would you look for such a star?

780. A star having the same declination as your latitude and of the same name, where would you look for it when it was on your meridian?

QUESTIONS FOR WHEELSMEN AND WATCHMEN.

391. How many points 77° ?

392. How many degrees in $5\frac{3}{8}$ points?

393. How many degrees in $\frac{1}{8}$ of a point?

394. How many degrees in $\frac{1}{16}$ of a point?

395. How many in $\frac{1}{32}$ of a point?

396. How many minutes of arc in $22^{\circ} 30'$?

397. How many minutes of arc in 45° ?

398. How many seconds of arc in 45° ?

399. How many degrees is it from E $\frac{1}{2}$ S to N E by E $\frac{1}{8}$ E?

400. How many points is it from N 40° to S 70° E?

ANSWERS TO QUESTIONS FOR WHEELSMEN AND WATCHMEN.

367. About $1\frac{3}{8}$ points.

368. $16^{\circ} 52' 30''$.

369. $1\frac{1}{2}$ points.

370. By dividing 360 degrees by 32.

371. $7^{\circ} 01' 52''$.

372. Dividing 360° by 32.

373. $60''$.

374. Thirds, marked thus, $'''$.

375. $1^{\circ} 24' 22'' 30'''$.

376. About $\frac{3}{8}$ of a point.

The New London Marine Iron Works, New London, Conn., is rebuilding the tug Mabel, owned by the Hartford & New York Transportation Co. Repairs are being made to her machinery and steam steering gear is being installed.

FIG. 1.

11.5 miles	N 30° E, Var. 13° Ely, Dev. 7° Ely.
27.0 miles	S 42° W, Var. 13° Ely, Dev. 10° Wly.
19.5 miles	S 17° E, Var. 13° Ely, Dev. 2° Ely.
32.0 miles	S 21° W, Var. 13° Ely, Dev. 5° Wly.
3.0 miles	S 73° W, Var. 13° Ely, Dev. 12° Wly.

FIG. 2.

A DAY'S WORK.

Compass Course.	Compass Correction.	True Course.	Miles.
N 30° E	20° Ely.	N 50° E	11.5
S 42° W	3° Ely.	S 45° W	27.0
S 17° E	15° Ely.	S 2° E	19.5
S 21° W	8° Ely.	S 29° W	32.0
S 73° W	1° Ely.	S 74° W	3.0
Difference of Latitude.		Departure.	
N.	S.	E.	W.
7.4		8.8	
	19.1		19.1
	19.5	0.7	
	28.0		15.5
	0.8		2.9
	67.4	9.5	37.5
	7.4		9.5
	60' = 1°		28'

FIG. 3.

THE TIME SIGHT.

Wt.	8h 04m 20s a. m. civil time the 19th is	
	12h	
C-W	20h 04m 20s astronomical time the 18th	
	5h 15m 10s	
	25h 19m 30s	
	5m 30s plus	
	25h 25m	
	-24h	
Gr. T.	1h 25m after noon Gr., 19th equals 1.4h.	
Eq. T.	-3m 42s	
G. A. T.	1h 21m 18s	
	Eq. T Diff. 1h .553s	
	1.4h after Gr. Noon.	
	.7742s	
Eq. T.	3m 43.19s	
Corr.	-.77	
	3m 42.21s Correct Eq. T.	
	Dec. Diff 1h 48.50"	
	1.4	
	67.9" = 1' 7.9"	
S. D.	16° 00" plus	Dip -4' 29"
I. E.	3 30" "	Ref. -2' 31"
	19° 30" "	7'
	-7	
Correction	12' 30" "	
Obs. Alt.	20° 57' 30"	
True Alt.	21° 10'	
Dec.	13° 4' 46.1"	
Corr.	-1' 7.9"	
	13° 3' 38.2" correct Dec. N.	
	90°	
P. D.	103° 3' 38.2" cosec 0.01138	
Lat.	21° 30' sec 0.03132	
Alt.	21° 10'	
Sum	2)145° 43' 38"	
½ sum	72° 51' 49" cos 9.46931	
	-20° 10'	
Diff.	51° 41' 49" sin 9.89473	
	2)19.40674	
	9.70337 sine of apparent time at ship equals 7h 57m 18s.	
Gr. App. T.	1h 21m 18s P. M.	
	12h	
	13h 21m 18s	
	7h 57m 18s a. m. at ship.	
	5h 24m west of Greenwich, equals Long. 81° W.	
	ALTITUDE AZIMUTH.	
Lat.	21° 30' sec. 0.03132	
Alt.	21° 10' sec. 0.03034	
P. D.	103° 3' 38"	
	2)145° 43' 38"	
½ sum	72° 51' 49"	

SHIP YARD NOTES.

The Kelley, Spear Co., Bath, Me., is framing out a large barge which it is to build for New York interests.

The submarine torpedo boat which the navy department has contracted for with the Lake Torpedo Boat Co. will be built at the yard of the Bath Iron Works, Bath, Me.

The big dry dock which is being erected at Orange, Tex., by the New Orleans Dry Dock Co., was launched recently and the remainder of the work upon it will be completed shortly.

The Union Iron Works, San Francisco, Cal., has just completed the steel barge Contra Costa for the Standard Oil Co. She is 185 ft. in length and has a capacity for 7,000 barrels of oil.

The New York Ship Building Co., Camden, N. J., has been awarded contract for the construction of two car floats for the Lehigh Valley Railroad Co. They are to have a capacity of 23 cars each.

The Kelley, Spear Co., Bath, Me., has completed the rebuilding of the former lake steamer Lucy Neff, and she has left that yard for San Francisco. The Neff was bought some time ago by the Tillamook Navigation Co. of San Francisco.

Robert Crawford, of Tacoma, Wash., will build a fine passenger launch for the Foss Boat Co. of that city. The new craft is to be 58 ft. in length with a 9-ft. beam and she will have a speed of 14 knots. Gasoline will be used as fuel and the engine will be of 30 H. P.

The William Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa., will repair the steamship Aries, which was burned at her pier in that city recently. The Aries is owned by the Merchants' and Miners' line and when in commission plies between Philadelphia, Fall River and Providence, Mass.

Joseph Supple, the Portland, Ore., ship builder, has been awarded contract for the construction of a stern-wheel steamboat for the Copper River & Northwest Navigation Co., of Alaska. The new vessel will be 100 ft. long, 24 ft. beam and 4 ft. depth of hold and she will be equipped with powerful machinery which will be built by the Willamette Iron & Steel Works, Portland. By the terms of the contract the craft must be ready for shipment to her northern station by May 1, it being intended to ship the vessel in knock-down form.

P. D.	103° 3' 38"	
½ sum	72° 51' 49"	cos. 9.46931
Diff.	30° 11' 49"	cos. 9.93667
	2)19.46764	

cos. 9.73382 equals angle 57° 10'

which is ½ the azimuth; true azimuth is S 114° 20' E. Azimuth tables for Lat. 22° S and Dec. 13° S and apparent time 7h 57m a. m. gives azimuth S 114° 27' E.

True Azimuth	S 114° 20' E	THE AZIMUTH MODE.
Var.	13° Ely	180°
		N 61° E is
Corr. Mag. Az.	S 127° 20' E	S 119° E
Comp. Az.	S 119° E	
Dev.	8° 20' Wly	
Compass Course	S 28° W	
Var.	13° Ely	
Corr. Mag. Co.	S 41° W	
Dev.	8° Wly	
True Co.	S 33° W	

FIG. 4.

Dec. Diff. 1h.	48.50"
	5.4
	261.900" equals 4' 21.9"

Dec. Gr. noon 19th	13° 4' 46.1" N
Correction for 5.4h.	4' 21.9"

Corr. Dec.	13° 0' 24.2" N
------------	----------------

S. D.	15' 50.19"
I. E.	3' 30" plus
	19' 20.19"
Dip. and Ref.	— 6' 59
Correction	12' 21" plus
Obs. Alt.	55° 7' 30" N
True Alt.	55° 19' 51" N

True Alt.	90° 00'
	55° 20' N
Z. D.	34° 40' S
Dec.	13° 0' 24" S
Lat.	21° 39' 36" S
Lat. and Long. by Observation:—	
Lat.	21° 39' 36" S
Long.	81° 27' 30" W
Lat. and Long. by D. R.:—	
Lat.	21° 58' 30" S
Long.	81° 35' W
Lat. in by obs.	21° 39' 36" S
Lat. left	20° 30' S

Diff. lat. 1° 9' 36" S equals 70' nearly.

Mid. Lat. 21°.	
Long. in by obs.	81° 20' W
Long. left	80° 45' W

Diff. long. 35' W

35' of long. in lat. 21° equals a dep. of 33' or miles, nearly.

Diff. lat. 70 and dep. 33 gives course and distance made good since preceding noon S 25° W 78 miles.

Diff. lat. and long. by D. R. and by Obs.:—

Lat. in by D. R.	21° 58' 30" S
Lat. in by obs.	21° 39' 36" S

Diff. lat. 18' 54" N equals 19'.

Long. in by D. R.	81° 35' W
Long. in by obs.	81° 21' W

15' E

Mid. lat. 22°.

FIG. 5.

THE COMPASS ERROR.	
Compass error 5° 40' Ely.	
True azimuth	S 114° 20' E
Compass azimuth	S 119° E
Compass error	5° 40' Ely
Variation	13° Ely
Deviation	8° 20' Wly
Deviation for ship's head correct magnetic,	
S 41° W is 8° 20' Wly.	
(The foregoing example was worked out by	
Capt. F. C. Watson, Long's Navigation School,	
Cleveland, O.)	

Representative Hayes, of California, acting under instructions of the committee on immigration has reported favorably a bill appropriating \$115,000

for the improvement of the ferry service between San Francisco and Angel island by enlarging the ferry slips and modernizing the ferry boats.

ATLANTIC COAST GOSSIP.

Office of the MARINE REVIEW,
Room 1005, No. 90 West St.,
New York City.

The British steamer William Cliff, which picked up the British steamer Cambrian, disabled through losing her propeller, in mid-Atlantic, and with considerable difficulty towed her to the British Isles, has been awarded \$25,000 salvage by the British courts. Capt. Davies receives \$1,500 and the crew \$4,750.

The Hamburg-American liner Kaisarine Auguste Victoria sailed from New York last Saturday inaugurating a new departure in steamship comfort. Owing to the extreme steadiness of the vessel at sea it has been found possible to have loose chairs at the tables in the dining saloon, so a number have been installed.

To avert a collision with the Dutch tank steamer Deutschland, during the thick fog and rain of Saturday morning, the Cunard liner Lucania was swung out of her course in the Gedney channel and went aground. She was apparently undamaged, however, and when refloated an hour later proceeded on her voyage. The Deutschland also ran ashore on a ledge in the channel and had difficulty getting off. She was damaged below the water line, springing several plates.

Beginning the latter part of June or early in July the North German Lloyd will inaugurate a special service to Norway and the far north for the benefit of summer tourists. The details of this service, duration, ports of call, steamers, etc., are now being perfected, and it is reported that some of the line's best steamers will be assigned to the service.

Repairs are to be made at Philadelphia to the British steamer Eagle Point which arrived at that port considerably overdue owing to the breaking of her crankshaft in midocean. A new shaft, forged at the works of the Bethlehem Steel Co., will be fitted, the repairs to take about 20 days.

Capt. R. A. Sargent and David H. Howard, United States inspectors of steam vessels, who were ordered to Porto Rico to inspect vessels engaged in local trade, left New York on Saturday on the steamship Seneca for Mayaguez.

Some interesting statistics made public recently by the department of

docks and ferries show that the gain in wharfage room in New York harbor has been over 30 per cent during the past two years—embracing the active administration of Commissioner John A. Rensel.

There is no improvement in the ice conditions of the Delaware River and Bay. While steam craft are still able to work their way through, it is with considerable difficulty. The ice is soft and coming down from the upper Delaware in such quantities as to keep the city ice boats busy breaking it up.

While bound from Frontera, Mexico, to Galveston, the Norwegian steamship *Livingstone* picked up a raft in the Gulf of Mexico upon which was a large dog held fast by a rope and half starved. The raft was a crudely constructed affair with a spar spiked in the center to which was lashed a barrel that had been whipped almost to shreds, and from the spar hung a piece of the blouse of a sailor. It is believed that the raft had held one or two men when set adrift.

At the request of Lieut. J. H. Williard, U. S. engineer corps, in charge of the Newport district, Capt. Amos P. Tefft, of the Point Judith life saving station, has furnished him with the number of vessels that have passed the station during the day for the past year. The figures state that in all 22,680 vessels of all sorts passed the station, and this number would probably be doubled if an account of the boats that passed in the night could have been kept.

Through a printer's error a daily paper is responsible for a news item in which a vessel is described as "standing inshore in a leaking condition and signaling for a tub." Possibly the crew intended bailing her out.

The three submarine boats, *Viper*, *Cuttlefish* and *Tarantula*, have left the Brooklyn navy yard for Annapolis under their own gasoline power. The naval tender *Hist* will accompany the submarines the entire distance. The flotilla is under the command of Lieut. C. E. Courtney on board the *Hist*.

The flotilla returned with propellers damaged by ice on its first attempt.

Among the passengers who arrived at New York Saturday on the Ward Line steamship *Monterey* were the chief engineer and 33 of the crew of

the German steamship *Baker*, which was wrecked on Colorado Reef, about 140 miles west of Havana, on Jan. 31.

The *Baker* was bound from Philadelphia to Port Barrios with a cargo of coal, her owners being M. J. Elsen & Co., and her agents in this country the United Fruit Co. She was built at Copenhagen in 1904 and was of 900 tons.

Only 11,122 vessels of all classes entered the harbor of New York last year.

The former lake steamer *Lucy Neff* arrived at New York by way of the Sound on her way from Detroit, Mich., to San Francisco. She left Detroit early in June and was overhauled at Bath, Me. Her course around to the Pacific will be through the Straits of Magellan, this being probably one of the longest trips ever taken by a steamer from port to port in the United States.

Reports from Washington, D. C., show that the Gulf, Mexican and Canadian border ports are making a much more rapid growth in their export trade than those of the Atlantic coast. In imports the relative loss on the part of the Atlantic ports is not so great as in exports. Figures of imports and exports during the calendar year 1907 have just been completed by the Bureau of Statistics of the Department of Commerce and Labor. They show that exports from the Atlantic coast ports which in 1897 formed 70 per cent of the exports formed in 1907, but 60 per cent of the total, while all the other ports of the United States increased their share from 30 per cent in 1897 to 40 per cent in 1907.

About 5,000 bales of cotton are floating about Trepassey Bay from the wrecked British steamer *Tolesby*. The fishermen in the vicinity are earning considerable money recovering this cotton at \$5 per bale, thus far about 500 bales having been recovered.

The *Tolesby* went on the rocks near Seal Cove Point on Jan. 13, while on her way from Galveston, Tex., to Havre, the crew being saved and the ship becoming a total loss.

Six coal barges belonging to the New England Transportation Co. and in tow of the tug *Frederick E. Ives*, while attempting to make New Haven harbor in the storm early Saturday struck the breakwater in the fog and

sank. They contained about 600 tons of coal. The barge hands were saved by the tug.

Capt. Pierre Verlynde, of the French liner *La Bretagne*, was found drowned in the water alongside his vessel a few moments before sailing on the last trip of the vessel from Havre. It is thought that some time during the night before sailing he started to go ashore, slipped on the gangway, and fell into the dock. Capt. Verlynde commanded the *Bretagne* for eight years.

The new Italian steamship *Duca Degli Abruzzi* arrived on Monday at New York, and will take up her regular sailing in the fast service between Italy and this city. The *Duca Degli Abruzzi* is 553 ft. in length and of 7,792 tons, propelled by twin screws of 8,000 H. P. She has accommodation for 100 first class and 1,800 steerage passengers, and averaged 17½ knots on her voyage over.

STEAMER FOR CAPT. SULLIVAN.

Capt. D. Sullivan of Chicago will add a modern freighter to his fleet at the opening of navigation. This vessel is now building at Lorain and will be ready for delivery when the navigation season opens. Contract for the steamer was originally placed by the Jenkins Steamship Co. of Cleveland but was later taken over by Capt. Sullivan and a new company formed to operate it. The steamer is 524 ft. over all, 504 ft. keel, 54 ft. beam and 31 ft. deep, having 30 hatches spaced 12 ft. centers. She will carry 9,000 tons of ore. She will be named the *W. H. Wolff*. Capt. Sullivan will also manage the *B. F. Berry* building for H. K. Oakes of Detroit, Mich. The Fremont Steamship Co. of Detroit has been incorporated to operate this steamer.

Bids for effecting repairs to the lighthouse tender *Holly*, received recently by the inspector of the fifth lighthouse district, were as follows: Booz Bros., Baltimore, Md., \$1,925; Marine Railway, Machine & Boiler Works, Baltimore, Md., \$2,054.55; McIntyre & Henderson, Baltimore, Md., \$2,007.50; Spedden Ship Building Co., Baltimore, Md., \$1,958.75; Skinner Ship Building & Dry Dock Co., Baltimore, Md., \$2,065; William E. Woodall & Co., Baltimore, Md., \$2,833; Chesapeake Marine Railway Co., Baltimore, Md., \$1,933. The contract will probably go to the last named as that bid is the lowest one submitted.

The International Contract Co., Seattle, Wash., has about completed the new King county ferry boat Washington, which is to ply between Seattle and Kirkland, and the launching was scheduled for Jan. 21, the occasion being made a gala event for the residents of both terminals. The launching however failed to be a complete success as the boat stuck when half way down the ways and so far has resisted all efforts to move it. The new ferry is 160 ft. long and 40 ft. beam, with ample accommodations for passengers as well as for horses and wagons, automobiles and the like. It is planned to have the ferry in operation in April.

DREDGING AT CAPE CHARLES CITY.

Bids for dredging harbor Cape Charles City, Va., opened by Maj. Joseph E. Kuhn, Norfolk, Va., on Jan. 29:

Names and Addresses of Bidders.	Price Cu. Yd.
River & Harbor Improvement Co., Philadelphia, Pa.	21 8/10c
L. M. Lewis, Norfolk, Va.	21 1/2c
Coastwise Dredging Co., Norfolk, Va.	24 3/10c
Norfolk Dredging Co., Norfolk, Va.	24 49/100c

BIDS FOR REPAIRING BUOYS.

Bids received at the office of the inspector of the thirteenth lighthouse district, Portland, Ore., on Jan. 24, for repairing buoys, were as follows:

*Astoria Iron Works, Astoria, Ore.	\$1,690
*J. Howatson, Portland, Ore.	2,545

*Accepted.

BIDS FOR LOCK WORK.

Bids received at the office of the U. S. engineer, Cincinnati, O., on Jan. 20, for raising crest of lock and dam No. 3, Big Sandy River, New Louisa, Ky., were as follows:

Midland Bridge Co., Kansas City, Mo. \$126,135

Draw Contracting Co., Pittsburg, Pa. 101,385

J. C. Thomas, Louisa, Ky. 62,380

Morris Turner & Co., Roanoke, Va. 95,505

The Penn Bridge Co., Beaver Falls, Pa. 66,282

BIDS FOR NAVAL SUPPLIES.

Bids received at the bureau of supplies and accounts, navy department, Washington, D. C., on Feb. 4, for materials and supplies for the navy yards, included the following:

Class 5—Mare Island—Red Sheet Rubber.	
William Wirt Clark & Sons, Baltimore, Md.	\$ 29.00
Jones-Beach Co., 204 N. Fourth St., Philadelphia, Pa.	33.50
National Electric Supply Co., Washington, D. C.	24.65
Western Electric Co., 463 West St., New York	27.55
Excelsior Equipment Co., Pittsburg, Pa.	28.86
Class 101—Pensacola—100 Sq. Yds. Sheet Gum Packing.	
Avery Hardware & Supply Co., Pensacola, Fla.	\$1,850.00
Boston Belting Co., 256 Devonshire St., Boston, Mass.	1,375.00
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York.	1,781.50
B. F. Goodrich Co., Akron, O.	525.00
Garlock Packing Co., 136 Liberty St., New York	887.50
Quaker City Rubber Co., Philadelphia, Pa.	1,236.00
Excelsior Equipment Co., Pittsburg, Pa.	1,162.50

BIDS FOR REPAIRS TO WHARF AT ASTORIA, ORE.

Bids received at the office of the engineer of the thirteenth lighthouse district, Portland, Ore., for repairs to wharf at lighthouse depot, Astoria, Ore., were as follows:

*Ferguson & Hanston, Astoria, Ore.	\$3,477.00
Fasteband, Palmberg & Hollack, As-	

toria, Ore.	4,835.00
Birch & Jacobsen, Astoria, Ore.	5,996.60
John Wattson, Astoria, Ore.	6,379.75
Frederick Bros., Astoria, Ore.	6,568.50

*Accepted.

BIDS FOR PILE WORK.

Bids received at the U. S. engineer office, Grand Rapids, Mich., for the construction of sheet pile revetment at Muskegon Harbor, Mich., opened Feb. 5, were as follows:

Burk, Smith & Nelson, Muskegon, Mich.	\$27,155.42
George E. Culbert, Michigan City, Ind.	28,291.92
A. J. Dupuis, Detroit, Mich.	28,776.12
Interstate Dredge & Dock Co., Duluth, Minn.	29,005.26
Columbian Construction Co., Muskegon, Mich.	29,888.53
M. Rabbitt & Sons Co., Toledo, O.	36,461.96
Marquette Construction Co., Chicago, Ill.	55,271.84

BIDS FOR NAVAL SUPPLIES.

Bids received at the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., on Feb. 11, for material and supplies for the navy yards, included the following:

Class 45—Brooklyn—4,000 Yds. Canvas.	
James R. Michael, New York.	\$3,320.00
Thomas M. Turner, 86 Worth St., New York	3,280.00
Class 46—Brooklyn—3,000 Yds. Canvas.	
James R. Michael, New York.	\$ 890.00
Thomas M. Turner, 86 Worth St., New York	874.00
Class 47—Brooklyn—7,000 Yds. Canvas.	
De Grauw, Aymer & Co., 34 South St., New York	\$3,317.30
O'Jaffe & Pinkus, 103 Franklin St., New York	3,094.00
Class 48—Brooklyn—8,000 Yds. Khaki Canvas.	
Otto Goetze Co., 109 Worth St., New York	\$2,882.50
John H. Meyer Co., 75 Worth St., New York	2,937.50
Class 63—Brooklyn—3,000 Ft. Rubber Fire Hose.	
Boston Belting Co., 256 Devonshire St., Boston, Mass.	\$2,640.00
S. R. Fletcher & Co., 26 Cortlandt St., New York	2,489.70
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York.	3,030.00
Manhattan Rubber Mfg. Co., 18 Vesey St., New York	2,625.00
Voorhees Rubber Mfg. Co., 48 Dey St., New York	2,489.70
B. F. Goodrich Co., Akron, O.	3,000.00
Class 64—Brooklyn—450 Ft. Rubber Suction Hose.	
Boston Belting Co., 256 Devonshire St., Boston, Mass.	\$1,575.00
Diamond Rubber Co., 1876 Broadway, New York	1,041.00
S. R. Fletcher & Co., 26 Cortlandt St., New York	1,345.50
Richard W. Geldart, 2 Stone St., New York	1,350.00
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York.	1,345.50
Manhattan Rubber Mfg. Co., 18 Vesey St., New York	1,350.00
Manning, Maxwell & Moore, 85 Liberty St., New York.	1,617.50
Manhattan Supply Co., 127 Franklin St., New York	1,345.50
Quaker City Rubber Co., 629 Market St., Philadelphia, Pa.	1,561.50
William R. Thompson, Brooklyn, N. Y.	1,350.00
Voorhees Rubber Mfg. Co., 48 Dey St., New York	1,345.50
B. F. Goodrich Co., Akron, O.	1,215.00
Class 65—Brooklyn—3,000 Ft. Wash Deck Hose.	
Boston Belting Co., 256 Devonshire St., Boston, Mass.	\$1,650.00
Eureka Fire Hose Co., 13 Barclay, New York	1,275.00
Fabric Fire Hose Co., Duane and Church St., New York.	1,800.00
S. R. Fletcher & Co., 26 Cortlandt St., New York	1,199.70
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York.	2,100.00
Manhattan Rubber Mfg. Co., 18 Vesey St., New York.	1,260.00
Voorhees Rubber Mfg. Co., 48 Dey St., New York	1,199.70
B. F. Goodrich Co., Akron, O.	1,260.00
Class 186—Brooklyn—100 Hydrometers and 240 Salinometers.	
Holmes & Maurer Mfg. Co., 85 Chambers St., New York	\$ 142.00
Edw. Kessling, 1027 Madison St., Boston, Mass.	114.20
A. E. Moeller, 261 Sumpter St., Brook-	

lyn, N. Y.	115.87
Philadelphia Thermometer Co., Philadelphia, Pa.	140.00
Queen & Co., 807 Arch St., Philadelphia, Pa.	215.00
Charles F. Taglibue Mfg. Co., 50 Fulton St., New York.	118.60
Vermilye & Power, 17 Battery Pl., New York	193.20

BIDS FOR NAVAL SUPPLIES.

Bids received at the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., Jan. 28, for materials and supplies for the navy yards, included the following:

Class 61—Mare Island—10,000 Lbs. Oakum.	
Central Metal & Supply Co., 609 E. Lombard St., Baltimore, Md.	\$ 850.00
William Wirt Clark & Son, Baltimore, Md.	799.00
Dunham, Corrigan & Hayden Co., San Francisco, Cal.	692.00
Richard H. Grey, 1777 Tenth Ave., New York	749.00
R. W. Geldart, 2 Stone St., New York	722.00
G. H. Josselyn & Co., San Francisco, Cal.	769.00
J. B. Kendall, Washington, D. C.	850.00
Vermilye & Power, 17 Battery Pl., New York	850.00
Old Dominion Paper Co., Norfolk, Va.	749.00
Class 62—Puget Sound—25,000 Lbs. Oakum.	
Central Metal & Supply Co., 609 E. Lombard St., Baltimore, Md.	\$1,962.50
William Wirt Clark & Son, Baltimore, Md.	1,997.00
Dunham, Corrigan & Hayden Co., San Francisco, Cal.	1,780.00
W. O. Davey & Sons, Jersey City, N. J.	1,750.00
Richard G. Grey, 1777 Tenth Ave., New York	1,872.50
R. W. Geldart, 2 Stone St., New York	1,722.50
William G. Johnson, Seattle, Wash.	1,775.00
Schwabacher Hardware Co., Seattle, Wash.	1,725.00
Vermilye & Power, 17 Battery Pl., New York	2,125.00
Old Dominion Paper Co., Norfolk, Va.	1,897.50
Class 63—Mare Island—20,000 Lbs. Oakum.	
Central Metal & Supply Co., 609 E. Lombard St., Baltimore, Md.	\$1,570.00
William Wirt Clark & Son, Baltimore, Md.	1,598.00
Dunham, Corrigan & Hayden Co., San Francisco, Cal.	1,384.00
Richard H. Grey, 1777 Tenth Ave., New York	1,498.00
R. W. Geldart, 2 Stone St., New York	1,394.00
G. H. Josselyn & Co., San Francisco, Cal.	1,538.00
Old Dominion Paper Co., Norfolk, Va.	1,680.00
Class 67—Mare Island—2,500 Lbs. Strip Gum Gasket.	
Boston Belting Co., 256 Devonshire St., Boston, Mass.	\$2,750.00
Diamond Rubber Co., 1876 Broadway, New York	1,950.00
B. F. Goodrich Co., Akron, O.	1,750.00
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York	2,550.00
R. C. Hoffman & Co., Baltimore, Md.	2,254.28
Manhattan Rubber Mfg. Co., 18 Vesey St., New York	1,937.50
Quaker City Rubber Co., Philadelphia, Pa.	3,125.00
Voorhees Rubber Mfg. Co., 48 Dey St., New York	2,400.00
Class 68—Puget Sound—1,100 Lbs. Strip Rubber.	
Boston Belting Co., 256 Devonshire St., Boston, Mass.	\$1,210.00
Bowers Rubber Works, 68 Sacramento St., San Francisco, Cal.	1,067.00
Diamond Rubber Co., 1876 Broadway, New York	1,858.00
B. F. Goodrich Co., Akron, O.	770.00
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York.	1,122.00
Manhattan Rubber Mfg. Co., 18 Vesey St., New York	852.50
Quaker City Rubber Co., Philadelphia, Pa.	1,375.00
Trenton Rubber Mfg. Co., Trenton, N. J.	880.00
Voorhees Rubber Mfg. Co., 48 Dey St., New York.	913.00
Class 84—Mare Island—67 Doz. Brass Gate Valves.	
Baker & Hamilton, 900 Third St., San Francisco, Cal.	\$1,573.35
Chapman Valve Mfg. Co., Indian Orchard, Mass.	3,703.20
Central Metal & Supply Co., 609 E. Lombard St., Baltimore, Md.	1,436.60
Richard H. Grey, 1777 Tenth Ave., New York	2,211.00
Manhattan Supply Co., 127 Franklin St., New York	1,762.24
Class 224—Washington—4 Artificial Horizons and 16 Surveying Sextants.	
F. E. Brandin Sons & Co., 814 Gates Ave., Brooklyn, N. Y.	\$1,284.00

Bausch & Lomb Optical Co., Rochester, N. Y.	1,440.00	Chapman Valve Mfg. Co., Indian Orchard, Mass.	381.60	Central Metal & Supply Co., 609 E. Lombard St., Baltimore, Md.	708.00
Keuffel & Esser Co., Hoboken, N. J.	1,245.60	Central Metal & Supply Co., 609 E. Lombard St., Baltimore, Md.	134.40	R. W. Geldart, 2 Stone St., New York	663.48
Class 226—Washington—18 Boat Clocks.		A. F. Keating Co., 452 Water St., New York	136.80	Knox & Bro., 96 John St., New York	668.88
Chelsea Clock Co., Boston, Mass.	\$ 247.50	Manhattan Supply Co., 127 Franklin St., New York	150.24	A. F. Keating Co., 452 Water St., New York	716.16
Vermilye & Power, 17 Battery Pl., New York	369.00	Manning, Maxwell & Moore, 85 Liberty St., New York	228.88	Lunkenheimer Co., Cincinnati, O.	620.49
Class 227—Washington—12 Binoculars.		C. W. Rainear, 518 Arch St., Philadelphia, Pa.	131.52	Manhattan Supply Co., 127 Franklin St., New York	289.88
Price & Keen, Philadelphia, Pa.	\$ 283.20	Class 288—Portsmouth—Valves.		Manning, Maxwell & Moore, 85 Liberty St., New York	729.48
Class 228—Washington—One Boat Sounding Machine.		Buckeye Iron & Brass Co., Dayton, O.	654.24	C. W. Rainear, 518 Arch St., Philadelphia, Pa.	657.48
D. Ballup, Washington, D. C.	\$ 160.00			Excelsior Equipment Co., Pittsburg, Pa.	1,185.60
Class 287—Portsmouth—96 Gate Valves.					
Buckeye Iron & Brass Co., Dayton, O.	\$ 190.08				

RIPRAP EASTERN SHORE LAKE MICHIGAN.

Abstract of bids for furnishing stone for pier filling and riprap at various harbors on Eastern Shore Lake Michigan, received and opened Jan. 15, 1908, in accordance with advertisement dated Dec. 16, 1907:

Name and address of bidder.	At St. Joseph Harbor, Mich.		At South Haven Harbor, Mich.				At Saugatuck Harbor, Mich.		At Holland Harbor, Mich.	
	100-lb. stone, 312 cords, per cord.	Total.	1,000-lb. stone, 90 cords, per cord.	500-lb. stone, 63 cords, per cord.	100-lb. stone, 111 cords, per cord.	Total.	500-lb. stone, 400 cords, per cord.	Total.	100-lb. stone, 172 cords, per cord.	Total.
Leathem & Smith Towing & Wrecking Co., Sturgeon Bay, Wis.....	.....	.....	.....	.....	.....	.....	.....	.....	\$ 7.97	\$1,370.84
Burk, Smith & Nelson, Muskegon, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
The Green Stone & Quarrying Co., Sawyer, Wis. ....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Great Lakes Dredge & Dock Co., Chicago, Ill.	\$13.00	\$4,056.00	\$16.75	\$16.25	\$15.50	\$4,251.75	\$15.00	\$6,000.00	\$16.00	\$2,752.00

Name and address of bidder.	At Grand Haven Harbor, Mich.			White Lake Harbor, Mich.			Pentwater Harbor, Mich.		Ludington Harbor, Mich.		
	500-lb. stone, 725 cords, per cord.	100-lb. stone, 335 cords, per cord.	Total.	500-lb. stone, 87 cords, per cord.	100-lb. stone, 157 cords, per cord.	Total.	500-lb. stone, 72 cords, per cord.	100-lb. stone, 391 cords, per cord.	Total.	100-lb. stone, 100 cords, per cord.	Total.
Leathem & Smith Towing & Wrecking Co., Sturgeon Bay, Wis.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Burk, Smith & Nelson, Muskegon, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
The Green Stone & Quarrying Co., Sawyer, Wis.	\$14.00	\$13.00	\$14,505.00	.....	.....	.....	.....	.....	.....	.....	.....
Great Lakes Dredge & Dock Co., Chicago, Ill.	15.75	15.00	16,443.75	\$17.75	\$17.00	\$4,213.25	\$16.75	\$16.00	\$7,462.00	\$16.00	\$1,600.00
	Manistee Harbor, Portage Lake Harbor, Mich.			Frankfort Harbor, Mich.			Charlevoix Harbor, Mich.				

Name and address of bidder.	100-lb. stone, 77 cords, per cord.	Total.	500-lb. stone, 60 cords, per cord.	100-lb. stone, 495 cords, per cord.	Total.	500-lb. stone, 35 cords, per cord.	100-lb. stone, 195 cords, per cord.	Total.	500-lb. stone, 55 cords, per cord.	100-lb. stone, 182 cords, per cord.	Total.
Leathem & Smith Towing & Wrecking Co., Sturgeon Bay, Wis.	.....	.....	\$ 8.97	\$ 7.97	\$4,483.35	\$ 8.97	\$ 7.97	\$1,868.10	\$10.23	\$ 9.23	\$2,242.51
Burk, Smith & Nelson, Muskegon, Mich.	.....	.....	10.00	8.75	4,931.25	10.00	8.50	2,007.50	11.00	9.00	2,243.00
The Green Stone & Quarrying Co., Sawyer, Wis.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Great Lakes Dredge & Dock Co., Chicago, Ill.	\$20.00	\$1,540.00	17.75	17.00	9,480.00	20.75	20.00	4,626.25	20.75	20.00	4,781.25

REVETMENT WORK AT MUSKEGON HARBOR.

Abstract of bids for construction of sheet pile revetment at Muskegon Harbor, Mich., received and opened Feb. 5, 1908, in accordance with advertisement dated Jan. 6, 1908:

To Furnish the Following Material and Secure It in Place in the Work.

No. of bids.	Name and address of bidders.	1. Oak Piles. 12,620 lin. ft., per lin. ft.	2. Oak Timber. 13,195 ft. B. M., per M. ft. B. M.	3. Pine or Douglas Fir Timber. 165,095 ft. B. M., per M. ft. B. M.	4. Pine or Douglas Fir Plank for Sheet Piles. 280,822 ft. B. M., per M. ft. B. M.	5. Pine or Douglas Fir Plank for Deck- ing. 10,805 ft. B. M., per M. ft. B. M.	6. Drift Bolts. 19,669 lbs., per lb.	7. Screw Bolts. 9,313 lbs., per lb.	8. Tie Rods. 12,397 lbs., per lb.	9. Carriage Bolts. 8,000 lbs., per lb.	10. Nails. 853 lbs., per lb.	Approximate Total.
1.	Burk, Smith & Nelson, Muskegon, Mich.	33c	\$60.00	\$43.00	\$45.00	\$42.00	4c	4c	4c	4c	4c	\$27,155.42
2.	Geo. E. Culbert, Michigan City, Ind., ..	35c	45.00	45.00	45.00	45.00	5c	6c	6c	5c	5c	\$28,291.92
3.	A. J. Dupuis, Detroit, Mich.	36c	52.00	46.00	47.00	39.00	4½c	4½c	5c	4½c	4½c	28,776.12
4.	Interstate Dredge & Dock Co., Du- luth, Minn.	34c	63.00	48.00	49.75	44.50	3c	3c	3c	3c	3c	29,005.26
5.	Columbian Construction Co., Muske- gon, Mich.	33c	57.00	42.50	54.00	45.00	4½c	4½c	4½c	5c	5c	29,888.53
6.	M. Rabbitt & Sons Co., Toledo, O., ..	41½c	57.75	57.75	57.75	57.75	8c	8c	8c	8c	8c	36,361.96
7.	Marquette Construction Co., Chicago, Ill.	69c	95.00	84.00	94.00	62.00	7c	9c	11c	9c	9c	55,271.84

RAISING THE CREST OF LOCK AND DAM NO. 3, BIG SANDY RIVER.

Abstract of proposals for raising crest of Lock and Dam No. 3, Big Sandy River, near Louisa, Ky., and constructing steel gates for the lock, received in response to advertisement dated Dec. 20, 1907, and opened Jan. 20, 1908, by Lieut. Col. J. G. Warren, Corps of Engineers, U. S. A., at Cincinnati, O.:

U. S. A., at Cincinnati, O.:

Classification—	Approximate Quantities.	(1) Midland Bridge Co., Kansas City, Mo.		(2) Dravo Contracting Co., Pittsburg, Pa.		(3) J. C. Thomas, Louisa, Ky.		(4) Morris, Turner & Penn, Roanoke, Va.		(5) Beaver Bridge Co., Beaver Falls, Pa.		
		Unit.	Total.	Unit.	Total.	Unit.	Total.	Unit.	Total.	Unit.	Total.	
Excavation	cu. yd.	1,500	\$10.00	\$15,000.00	\$ 2.00	\$ 3,000.00	\$ 1.00	\$ 1,500.00	\$ 1.50	\$ 2,250.00	\$ 0.54	\$ 810.00
Embankment	cu. yd.	500	0.75	375.00	1.00	500.00	1.00	500.00	0.50	250.00	0.80	400.00
Concrete	cu. yd.	1,900	13.00	24,700.00	9.00	17,100.00	4.00	7,600.00	7.00	13,300.00	7.45	14,155.00
Riprap	tons	1,000	3.50	3,500.00	3.50	3,500.00	2.00	2,000.00	2.00	2,000.00	1.70	1,700.00
Paving	sq.yds.	700	2.00	1,400.00	4.25	2,975.00	3.00	2,100.00	3.00	2,100.00	1.70	1,190.00
Bolt holes	lin. ft.	500	0.60	300.00	1.00	500.00	1.00	500.00	0.75	375.00	0.60	300.00
Removal of weir sill.....	lump sum	....	....	5,000.00	....	2,000.00	....	600.00	....	3,500.00	....	940.00
Removal of lock gates.....	lump sum	....	....	3,000.00	....	2,000.00	....	600.00	....	500.00	....	480.00
Placing pass trestles.....	lump sum	....	....	5,000.00	....	2,000.00	....	3,000.00	....	1,000.00	....	5,500.00
Cement	barrels	2,000	2.50	5,000.00	2.50	5,000.00	1.50	3,000.00	2.25	4,500.00	2.30	4,600.00
Timber	M. Ft. B. M.	50,000	50.00	2,500.00	120.00	6,000.00	100.00	5,000.00	60.00	3,000.00	60.00	3,000.00
Lumber	M. Ft. B. M.	3,000	150.00	450.00	120.00	360.00	100.00	300.00	140.00	420.00	100.00	300.00
Piling	lin. ft.	4,000	0.90	3,600.00	1.00	4,000.00	0.75	3,000.00	0.50	2,000.00	0.40	1,600.00
Gages	lin. ft.	5	5.00	25.00	5.00	25.00	4.00	20.00	10.00	50.00	3.50	17.50
Iron and steel.....	pounds	400,000	0.14	56,000.00	0.13	52,000.00	0.081	32,400.00	0.15	60,000.00	0.077	30,800.00
Skilled labor	hours	100	0.75	75.00	0.75	75.00	0.50	50.00	0.50	50.00	0.70	70.00
Unskilled labor	hours	700	0.30	210.00	0.50	350.00	0.30	210.00	0.30	210.00	0.60	420.00
Total.....				\$126,135.00		\$101,385.00		\$62,380.00		\$95,505.00		\$66,282.50

GUIDE WALLS, DAM 13, OHIO RIVER.

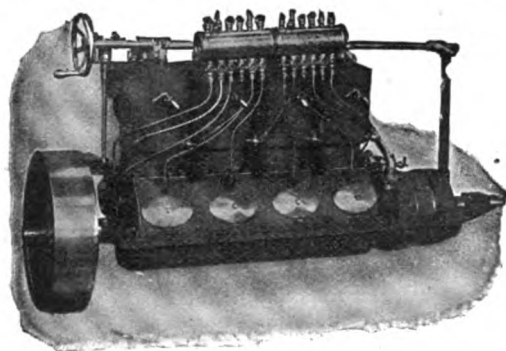
Abstract of proposals for constructing guide walls, etc., for Dam No. 13, Ohio river, received in response to advertisement dated December 27, 1907, and opened at Wheeling, W. Va., Jan. 25, 1908, by Captain F. C. Boggs, Corps of Engineers, U. S. A.

		1 James Skene & Sons, St. Louis, Mo.		2 The Hollerbach & May Contract Co., Evansville, Ind.		3 Fisher, Riley & Carozza, Baltimore, Md.		
Designation.		Quantity.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.
Excavation	Cu. yd.	42,400	\$ 1.00	\$ 42,400.00	\$ 0.40	\$ 16,960.00	\$ 0.75	\$ 31,800.00
Fill	Cu. yd.	6,400	0.50	3,200.00	0.75	4,800.00	0.60	3,840.00
Base for paving	Cu. yd.	2,900	2.00	5,800.00	3.00	8,700.00	1.70	4,930.00
Riprap	Cu. yd.	4,800	5.50	26,400.00	3.25	15,600.00	3.75	18,000.00
Round piles	Lin. ft.	16,900	0.50	8,450.00	0.50	8,450.00	0.55	9,285.00
Sheet piles	Ft. B. M.	220,000	65.00	14,300.00	60.00	13,200.00	80.00	17,600.00
Lumber	Ft. B. M.	4,650	45.00	209.25	60.00	279.00	60.00	279.00
Concrete, Class A.	Cu. yd.	6,650	10.00	66,500.00	7.00	46,550.00	8.15	54,197.50
Concrete, Class B.	Cu. yd.	3,200	7.50	24,000.00	7.50	24,000.00	8.00	25,600.00
Stone masonry	Cu. yd.	175	8.00	1,400.00	10.00	1,750.00	12.00	2,100.00
Pointing stone	Sq. yd.	210	0.50	105.00	2.00	420.00	2.00	420.00
Sewer	Lin. ft.	550	0.50	275.00	0.75	412.50	0.60	330.00
Drain	Lin. ft.	655	0.25	163.75	0.50	327.50	0.40	262.00
Manholes, complete	Number	2	100.00	200.00	100.00	200.00	100.00	200.00
Pipe, 4-inch	Lin. ft.	370	1.15	425.50	1.25	462.50	2.48	917.60
Pipe, 3-inch	Lin. ft.	2,050	0.95	1,947.50	1.00	2,050.00	1.16	2,378.00
Pipe, 1½-inch	Lin. ft.	2,700	0.50	1,350.00	0.75	2,025.00	0.72	1,944.00
Steel	Pound	5,850	0.07	409.50	0.08	468.00	0.05	292.50
Forgings, bolts, etc.	Pound	8,700	0.07	609.00	0.08	696.00	0.08	696.00
Total				\$198,144.50		\$147,350.50		\$175,081.60

*Contract awarded to Mollerbach & May Contract Co.

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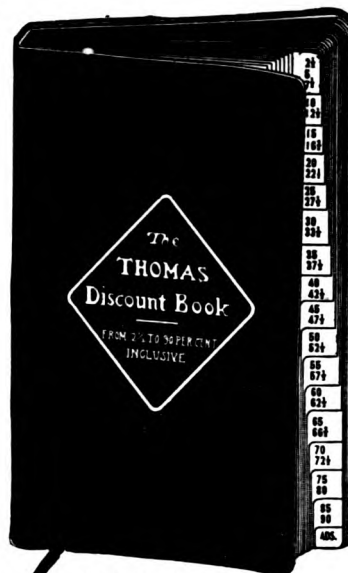
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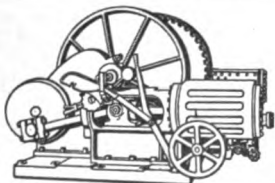
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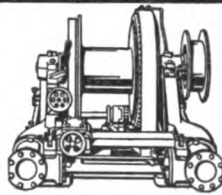
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The Star indicates alternate insertions, the Dagger once a month.

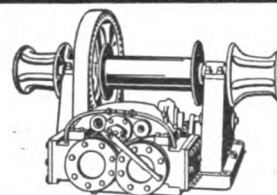
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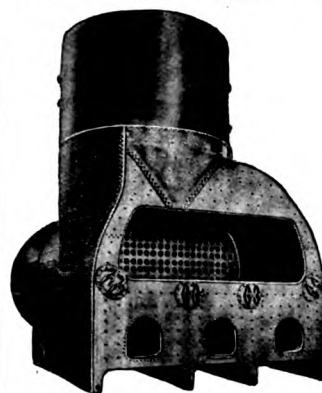
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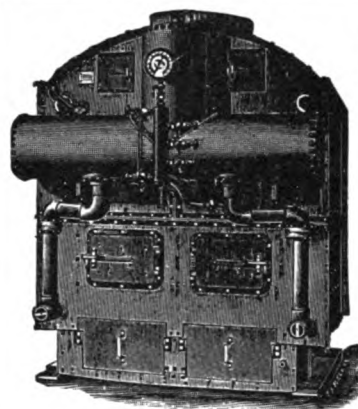
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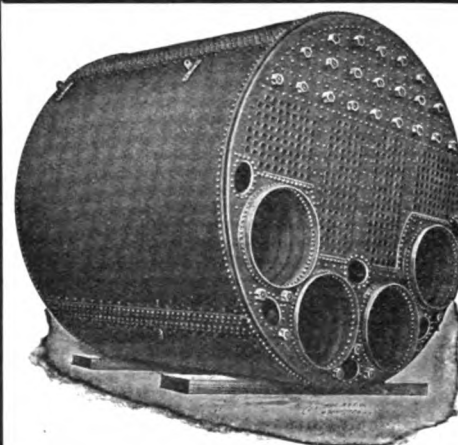
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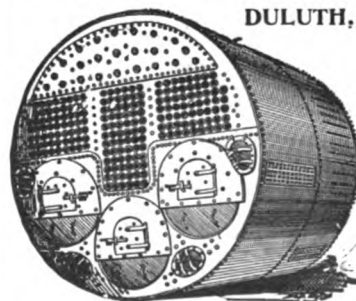
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PROPOSALS.—Sale of U. S. vessels *Pinta* and *Canonicus*.—Sealed proposals will be received at the Navy Department until noon on the 19th day of February, 1908, at which time and place they will be opened, for the purchase of the U. S. vessels *Pinta* and *Canonicus*, appraised values, \$1,400 and \$6,000, respectively. They will be sold for cash to the person or persons or to the corporation or corporations offering the highest price therefor. A separate proposal for each vessel bid upon must be submitted in a sealed envelope addressed to the Secretary of the Navy, Washington, D. C., endorsed "Proposals for the purchase of the U. S. S. —" (naming the vessel for which offer is made), and each proposal must be accompanied by a satisfactory certified check for not less than 10 per cent of the amount of the offer. On application to the Navy Department, forms of bids and bonds, together with the terms and conditions of sale, also a printed list giving general information concerning these vessels, will be furnished. The vessels can be examined at any time after this date by applying to the Commandants of the navy yards, Mare Island, Cal., and Norfolk, Va., respectively, where they now lie. They must be removed from the limits of said yards within such reasonable time as may be fixed by the department. The Department reserves the right to withdraw either or both of the above-named vessels from sale and to reject any or all bids. **TRUMAN H. NEWBERRY, Assistant Secretary of the Navy.** January 11, 1908.

U. S. Engineer Office, Milwaukee, Wis., January 24, 1908. Sealed proposals for building reinforced concrete caisson breakwater, pile pier, and plank cribs, removing old pier, and dredging, at Algoma Harbor, Wis., will be received here until 2 p. m., February 24, 1908, and then publicly opened. Information furnished on application. **W. V. Judson, Major, Engrs.**

U. S. Engineer Office, Jones building, Detroit, Mich., Feb. 4, 1908. Sealed proposals for widening St. Mary's Falls Canal will be received at this office until 3 P. M., March 5, 1908, and then publicly opened. Information furnished on application. **Chas. E. L. B. Davis, Col. Engrs.**

U. S. Engineer Office, 57 Park street, Grand Rapids, Mich., Feb. 4, 1908. Sealed proposals for repair of South Pier at Charlevoix Harbor, Mich., will be received here until 3 P. M., March 5, 1908, and then publicly opened. Information furnished on application. **M. B. Adams, Col. Engrs.**

U. S. Engineer Office, Buffalo, N. Y., Jan. 14, 1908. Sealed proposals for the construction of concrete walls for Ship Lock, Black Rock Harbor, at Buffalo, N. Y., will be received at this office until 11 o'clock a. m., March 14, 1908, and then publicly opened. Information furnished on application. **H. M. Adams, Col. Engrs.**

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PASSENGER BOAT WANTED, length 75 to 80 ft., beam 17 to 18 ft., single deck. Give full description of hull, engine and boiler. We have a Steamer For Sale, or exchange, which is a little too large for our business. Address **L. E. Eggert, Muskegon Heights, Mich.**

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